Paper

Dec. 28, 1950

ARE YOU USING THE PROPER TYPE OF VISCOSIMETER?

WHAT ARE THE REQUIREMENTS OF A GOOD PULPER?

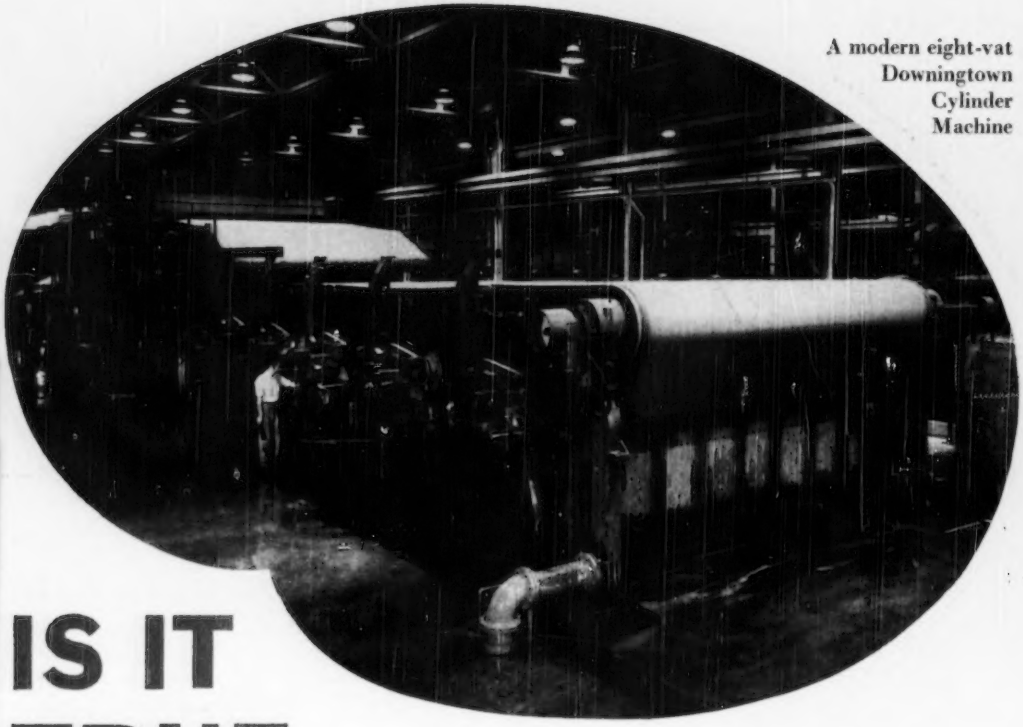
WHAT EFFECT HAS INSTRUMENTATION ON EFFICIENCY?

Season's Greetings

In commencing the new year, we think with gratitude of our old friends whose faith has been a bulwark. Their continuing confidence is a heritage of inestimable value. We also greet new friends with the firm belief that time alone is necessary to make them old friends . . . To all in the Pulp and Paper Industry, our best wishes for a very

HAPPY NEW YEAR

GOTTESMAN & COMPANY, Inc.



A modern eight-vat Downingtown Cylinder Machine

IS IT TRUE what they say about cylinder machines?

When people in the paper and board industry say that cylinder machines haven't improved as fast as Fourdriniers, it simply means that they haven't seen the new Downingtown Cylinder Machines. We can say this honestly, because we are proud of our Fourdriniers, too.

Twenty-nine Cylinder Machines now operating incorporate the modern Downingtown Approach Flow Vat System. This system provides maximum simplicity and ease of operation commensurate with maximum performance. Making sheets calipering from 9 to 50 points to an accuracy of plus or minus ½ point, and maintaining weight to within 2 to 4%, they are setting new standards of performance in the industry.

You owe it to yourself to find out just how good the new Downingtown Cylinder Machines are. Write us.

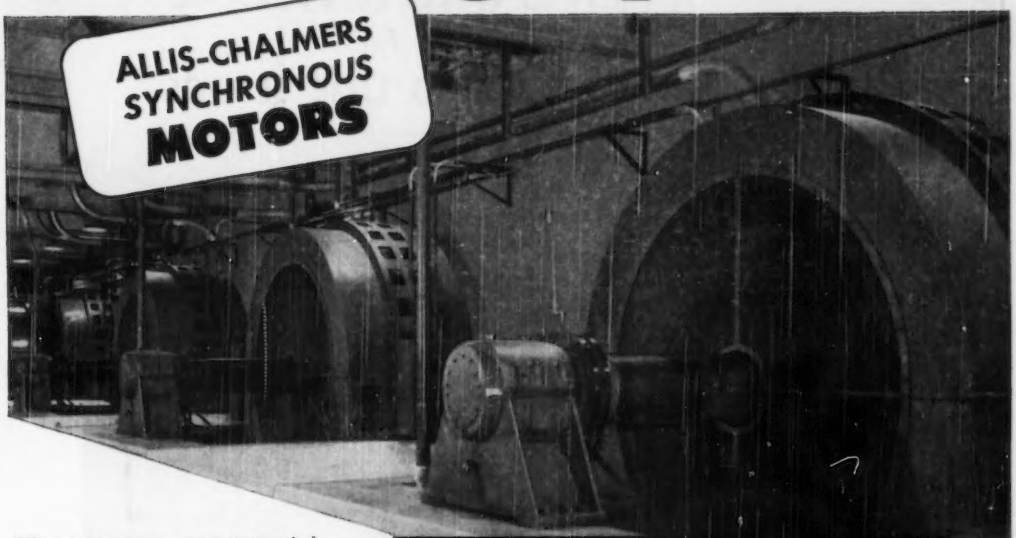
DOWNINGTOWN MANUFACTURING COMPANY

DOWNINGTOWN, PA.

Pacific Coast Representative: JOHN V. ROSLUND, Pacific Bldg., Portland 4, Ore.

DESIGNERS AND BUILDERS OF PAPER AND BOARD MAKING MACHINERY SINCE 1880

Built to HOLD Grinding Speeds!



Five 3,500 hp, 11,200 volt, 257 rpm Allis-Chalmers motors driving Roberts Grinders in new Coosa River Newsprint mill, Childersburg, Alabama.

FOR CONTINUOUS, HIGH-SPEED grinding power, Allis-Chalmers motors were specified for five *Roberts* Grinders in this 100,000 ton capacity newsprint mill. These grinder-motor "teams" pay off with stone surface speeds up to 5000 ft per minute.

Why Specify Allis-Chalmers?

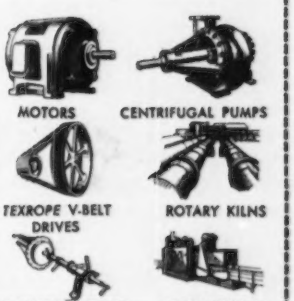
Here's why you should use Allis-Chalmers synchronous motors for chipper, grinder, other heavy-duty mill drive jobs:

1. Welded steel stator yoke provides strength against deformation.
2. Stator yoke punchings of high-grade, non-aging steel minimize core losses.
3. Fan at each end forces air into core and out through yoke.
4. Ring-oiled bearings are dust-proof . . . special oil seals eliminate leakage from bearings or creeping of oil along motor shaft.

For *any* main or auxiliary drive or generator needs, you can get Allis-Chalmers motors or generators in all sizes ranging from 1 hp to the largest. Allis-Chalmers a-c and d-c motors — bracket-bearing, pedestal bearing or engine-type — are designed to give you long life with proved low maintenance. And be sure to look into "matching" controls for your needs.

Contact your nearby A-C office for synchronous motor Bulletins 06B6033A and 05B6112A or general motor bulletin 51B6052. A-3174

ALLIS-CHALMERS, 994A SO. 70 ST.
MILWAUKEE, WIS.



AND OTHER EQUIPMENT FOR PAPER MAKING . . .

Texrope, Hi-Density and Streamborker are Allis-Chalmers trademarks.

ALLIS-CHALMERS

SMIDTH

ROTARY KILNS

For

REBURNING LIME SLUDGE

The illustration above shows a modern, efficient, Smidth Rotary Kiln for reburning lime sludge at the plant of the West Virginia Pulp & Paper Co., Charleston, South Carolina.

F. L. Smidth & Co. are specialists in the design and manufacture of rotary kilns and have furnished numerous installations in many countries for burning lime, lime sludge, dolomite, magnesite, cement, ores, etc.

F. L. SMIDTH & CO.

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E. P. McGINN
Industrial Editor

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R. S. THUEMMES
Managing Editor

E. P. NUTTALL
Associate Editor

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GEORGE E. LOCKWOOD
President and Treasurer

ARTHUR E. GORDON
Vice-President
Phone: PLaza 7-2370

FREDERICK E. WINKLER
Secretary

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ABC

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ABP

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DATES TO REMEMBER

JANUARY 9: Metropolitan Group, TAPPI, Monthly Meeting, Fraunces Tavern, N. Y. C.

JANUARY 15-18, 1951: Plant Maintenance Show & Conference, Public Auditorium, Cleveland, Ohio.

JANUARY 22-26: Tenth International Heating & Ventilating Exposition, Commercial Museum, Philadelphia, Pa. (Am. Society of Heating & Ventilating Engineers).

JANUARY 24-26: Canadian Pulp & Paper Assn., Mount Royal Hotel, Montreal, Que.

FEBRUARY 19-22: Technical Assn. of Pulp & Paper Industry, Annual Meeting, Hotel Commodore, N. Y. C.

FEBRUARY 19-22: American Paper & Pulp Assn., Annual Meeting, Waldorf-Astoria Hotel, N. Y. C.

FEBRUARY 21: Mass. Institute of Technology Alumni, Annual Luncheon in connection with TAPPI convention; 12:00 noon, Engineer's Club, N.Y.C.

FEBRUARY 21: New York State College of Forestry, Paper and Pulp Alumni: Annual Luncheon, Hendrick Hudson Room, Roosevelt Hotel, N. Y. C.

FEBRUARY 21: University of Maine, Paper and Pulp Alumni: Annual Meeting, Biltmore Hotel, N. Y. C.

NEXT WEEK

Fish or Factories? Excerpts from the record of the Pulp and Paper Makers on Stream Improvement.

Foreign Trade for Defense? A policy for us to follow, as declared by the Foreign Trade Convention.

The third installment of "Vis- by Neill MacCoull, contains additional contributions to the knowledge and measurement of fluid flows.

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SCORING OF DRIER ROLL BEARINGS ELIMINATED BY SUNVIS H.D. 740 OIL

Lubricants in the bearings of high-speed paper-mill driers are subjected to heavy loads, destructive temperatures, and considerable contamination. Most oils will break down in continued operation under such conditions. When they do, bearings become scored. That happened in one of the world's largest paper-making mills, as disclosed in a routine inspection of drier roll bearings lubricated for 24 months with a supposedly adequate oil.

The mill requested the cooperation of the machine and bearing manufacturers in finding an oil that would eliminate such trouble in the future. As a result, many different oils were compared on various extreme-pressure testing machines. Sunvis H.D. 700 Oils, and one other, proved to be the best by far, among all those tested. A Sun oil was chosen because of the company's reputation for service.

In actual operation the oil chosen, Sunvis H.D. 740, has well justified its selection. Since its use, bearing race scoring and the threat of bearing failures have been minimized. It has also minimized the danger from the unavoidably continuous contamination. The mill's engineers recently demonstrated their satisfaction by specifying Sunvis H.D. 740 Oil for a new machine—*one that will be among the fastest producers in the world.*

YOUR PAPER-MAKING MACHINES

will operate better if you lubricate the circulating systems with Sunvis H.D. 700 Oils. They maintain an unbroken lubricating film under heavy pressures and at high temperatures, thus preventing scoring in drier roll anti-friction bearing races. Sunvis H.D. 700 Oils are unsurpassed for protection against rust and corrosion. And their exceptional stability permits them to be used for years without replacement. For complete information, call or write the nearest Sun Office.

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Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, December 27, 1950.

Like the rest of U. S. business, the industry awaits ESA clarification of the "fair standards" announced for prices by that agency last week. Just how a voluntary price freeze at December 1 levels can be effected by the associated segments of the industry and by their suppliers of pulps, waste papers, etc., is a source of perplexity, doubt, and immobility. To press time, no action towards such a freeze has been reported in industry circles.

Raw Materials and Paper Prices

A freeze at December 1 levels would roll back the price of almost every paper and board and products thereof. Increases which average $10 a ton were announced early in the month, some to be effective immediately, others January 1.

Since such advances were based on announced and anticipated increases in pulp prices, and on rocketing prices of waste papers, cottons, etc., "fair standards" control would have to be applied to raw materials supply before consuming mills could roll their prices back to December 1 levels.

When, however, it is considered that an important 12 percent of the market pulp consumed in October (latest available figures) came from Canada and Scandinavia, which could not be subjected to such a U. S. price regulation, one concludes that here at least some *adjustment* must be made in the "Fair Standards" regulation. At a time when production must be held to capacity levels, when mill stocks of pulps are over 200,000 tons, or 34 percent, below December 1948 figures; pulp producers far behind third and fourth quarter commitments and *closed water* season just ahead; and when all the pulp the Scandinavian mills can produce can be sold in other world markets at much higher prices than those announced for our first quarter, 1951; then market pulp consumers view with alarm any price action which threatens a loss of pulp tonnage to them.

First Quarter Pulp Prices

A discussion of the details of the new quarter's prices will be deferred by *Trends*, pending the outcome of the "Fair Standards" rulings. Details by grades are reported on "Prices" page. Generally speaking, Scandinavian pulps advanced $15 and $20 per ton, on dock basis; Canadians, $10 to $25; U. S., $7 to $15 and up.

Waste Paper Supply

Questions which rose most repeatedly during the week in market discussions centered about supply and price of waste papers. What, for instance, is the normal price ratio of waste paper substitutes to the virgin pulp price? If this figure is close to the 75 percent generally accepted, should not current prices be rolled back to that level for a "fair standards" price? Such consumer reasoning pertains only to the "hard whites" category, substitutes for bleached sulfites, to the new kraft cuttins and envelopes, substitutes for unbleached kraft pulps, etc., those grades which are not subject to the extreme fluctuations of market supply and demand which make the "low bulkies" market a feast or a famine. (The flow of *high grade* cuttings normally is dependent only on the capacity of paper and envelope production. Prices thereof respond to demand and *Vagaries* of a commodity market.)

Anxiety also was expressed that prices of low bulky grades (mixed, news, old corrugated, mixed books, etc.) be set at a level high enough to insure a voluminous flow to the mills. When collecting, sorting and packing operations are profitable, the paper and board mills can be certain of supplies.

Waste paper consumption in October ran close to 19 percent ahead of 1949's month. November and December reports are expected to show large gains over October's 754,296 tons.

There is no shortage of waste paper, the Eastern Conservation Committee (ECC) points out. Mill consumption is at its highest peak, receipts are abreast of consumption with none being acquired for inventory. In some instances, insufficient market stocks have forced withdrawal from inventories, a condition not considered good husbandry in view of the stormy weather ahead when collections usually ebb.

Prices of these low grades are being forced up daily by the terrific mill demand and inadequate supply. Reported in the New York area is heavy buying from Canadian and western mills. No "fair standards" action had been reported by the waste paper industry.

If in their own interests alone, wide publicity should be given by the mills among their own employes to the cross-country conservation campaigns recently launched by the National Association of Waste Material Dealers, and supported by the ECC and Midwest Consumers Waste Paper Program.

"Selective Controls" For Canadians

OTTAWA—There is a strong hint in official circles here that as far as total price controls are concerned at the present time in Canada, the current defense program does not warrant such action, with this being highly significant for the operations of the Canadian pulp and paper industry.

However, it also is indicated that the Canadian Government is ready now to use controls on a selective basis, and a start in this direction already has been made, with other use of such controls on a comprehensive basis being applied quickly whenever necessary.

"Ottawa is not bound to follow Washington," said a spokesman for the Canadian Government. "But Canadian prices cannot be insulated against the United States market."

New Newsprint Rise Seen

According to Toronto sources, it is likely that a new round of rises in newsprint prices is in the making for early 1951. The $6 rise may be boosted back to the original $10, it is stated, many producers being dissatisfied with that increase in view of steadily increasing costs.

Materials

WASHINGTON—Dry casein production rose to 17,070,000 pounds in the January-October, 1950, period, compared with 16,478,000 pounds in the same period of 1949, the Agriculture Department reported last week.

Manufacturers' stocks of dry casein at the end of October were estimated to total 2,375,000 pounds, 71 percent above the record low recorded in October, 1949, but 44 percent off from the 1944-48 average, the Department reported.

—E. P. N.

WOODPULP: U. S. PRODUCTION, CONSUMPTION, INVENTORIES, OCTOBER, 1950
(Tons of 2,000 pounds)

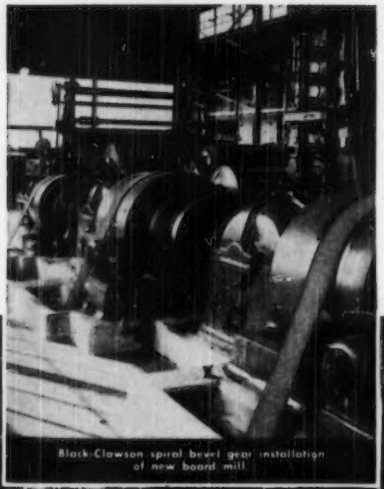
Grade	U. S. Production		Consumption in paper & bd. manuf.	End of Month Inventories	
				At pulp mills, for later sale	At paper & bd. mills
	Tons	% of Base			Oct. / Sept.*
Total	1,367,424	94.8	1,511,293	16,806	400,250 / 407,320
Sulfite, Total	256,406	92.4	298,597	10,424	175,989 / 185,370
Blchd., Total	191,398		185,761	9,024	81,725 / 88,777
Dissolving	43,639		3,491		7,581 / 9,271
Softwood	137,929		170,041		69,577 / 74,549
Hardwood	9,830		12,229		4,567 / 4,957
Unblchd.	65,008		112,836	1,400	94,264 / 96,593
Sulfate, Total	710,507	100.8	780,103	4,527	177,105 / 168,295
Blchd., Total	143,293		177,055		93,461 / 83,123
Semi-blchd.	33,569		36,361		4,716 / 4,463
Unblchd.	533,645		566,687		78,928 / 80,709
Soda	38,127	74.6	44,084	168	11,848 / 13,964
Groundwood	201,651	84.6	227,344	222	30,682 / 34,934
All Others	160,733	94.2	161,595	1,465	n.a. / n.a.

Based on Bureau of Census figures. n.a.—not available. * Revised.

Paperboard Production (Tons)*

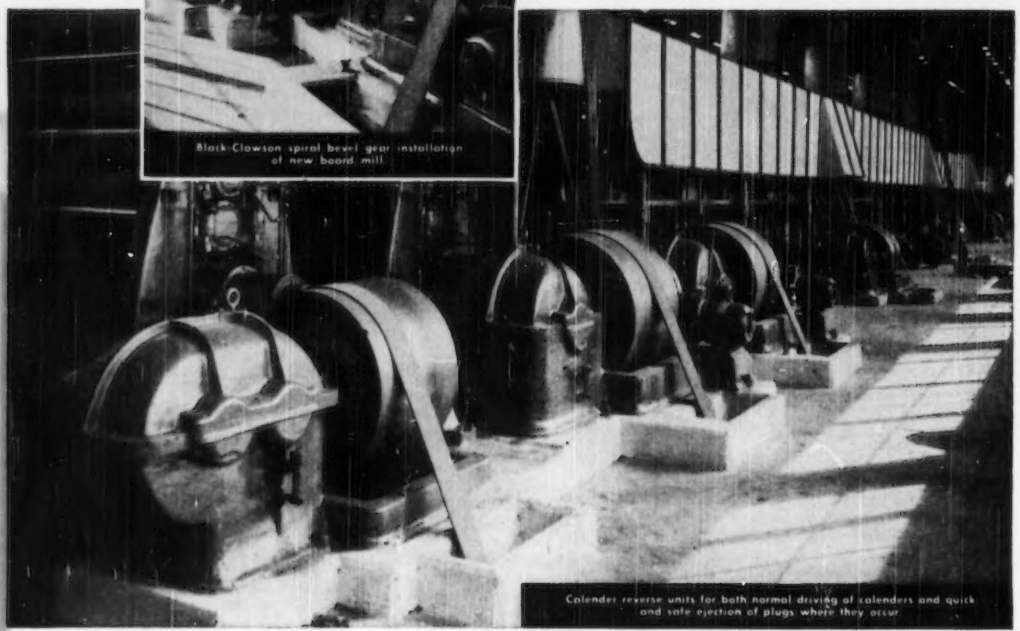
	Dec. 16 1950	Dec. 9 1950	Dec. 17 1949
Production	239,164	243,297	204,204
New Orders	204,724	243,978	167,383
Unfilled Orders	681,676	721,122	377,366

* Source: NPA.



Black-Clawson spiral bevel gear installation of new board mill

The DRIVE
that really pays off



Calender reverse units for both normal driving of calenders and quick and safe ejection of plugs where they occur

Hitch your paper machine to the most dependable make of drives that money can buy and you will avoid many a shut down for repair and many a production loss.

There is no better drive in existence than the Black-Clawson—no more generally used drive—no more dependable drive.

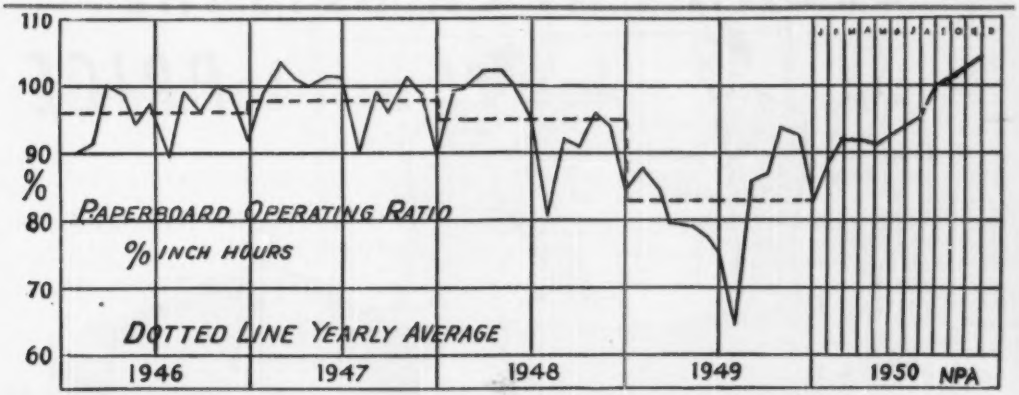
B-C drives are exceptionally rugged. They're quiet. They're virtually vibrationless. They're easy to synchronize to the required variations in speed of the several sections of the machine—particularly new machines.

- Spiral bevel gear • Extended Shaft (Double Reduction with or without Airflex Clutch operation)
- Hypoid gear • Calender reverse • Dryer inching

THE BLACK-CLAWSON CO., Hamilton, Ohio

DIVISIONS: SHARTLE BROS. MACHINE CO., Middletown, Ohio
DILTS MACHINE WORKS, Fulton, New York
WESTERN SALES OFFICE: Mayer Bldg., Portland, Oregon
ASSOCIATE: ALEXANDER FLECK LIMITED, Ottawa, Canada
SUBSIDIARY: B-C INTERNATIONAL, LTD., 16 Catherine Place, Victoria, London S. W. 1, England

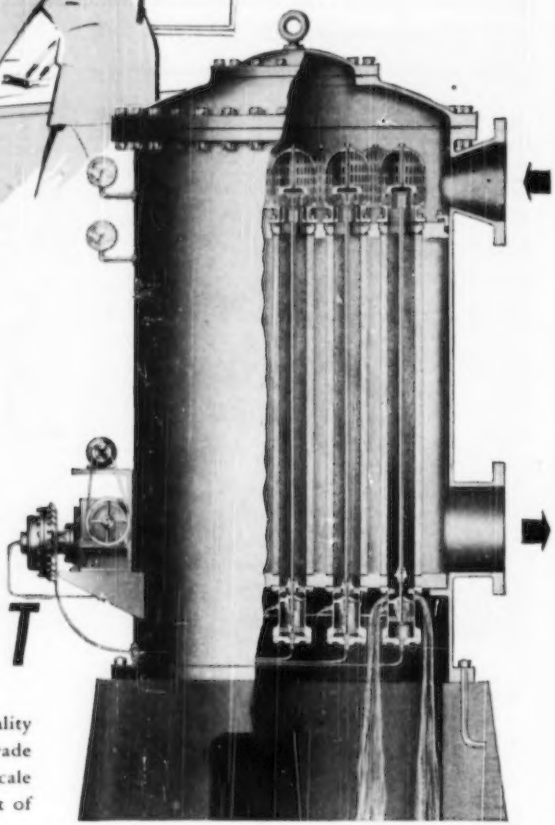
OUR BUSINESS



Source	Production	WEEK ENDING Dec. 16, '50	Nov. 18, '50	Dec. 17, '49
APPA	Paper Production percent 6-day Capacity	106.9	106.8	98.7
	Unbl. Kraft Paper Production percent	98.9	99.3	93.7
NPA	Paperboard Operating Ratio percent inch hours	105.0	103.0	92.0
		Oct. 1950	**Sept. 1950**	**Oct. 1949**
APPA	Paper Production* (Except Newsprint and Building Papers) Tons	841,000	766,000	765,612
	New Orders Tons	836,000	820,000	803,535
	Unfilled Orders Tons	899,200	932,000	497,820
	Shipments Tons	850,000	772,000	768,592
		Nov. 1950	**Oct. 1950**	**Nov. 1949**
NPA	Paperboard Production Tons	1,168,958	944,672	882,800
	New Orders Tons	1,225,369	931,828	887,000
	Unfilled Orders Tons	722,046	694,741	429,800
	Our Customers Activities Index[1]	**Latest Mo.**°	**Previous Mo.**°	**Year Ago**°
FRS	Manufactures Total Index	228	225	179
	Durable Mfg. Index	262	254	176
	Nondurable Mfg. Index	201	201	181
	Chemical Products Index	280	272	245
	Mfg. Food Products Index	178	193	177
	Printing and Publishing Index	181	173	169
ODC	Magazine Advg.-Printer's Ink Index	342	338	294
	Retail Sales Combined Adjusted Index	323.3	332.3	294.4
	Drug Index	223.4	227.8	220.0
	General Merchandise Group Index	299.2	321.5	273.9
	Grocery and Combination Index	394.7	391.2	358.8
	Prices Index			
BLS	Consumers Price Index[1]	174.8	173.8	168.5
	Wholesale all Commodities[2]	169.1	169.5	152.2
	Wholesale Foods[2]	172.5	177.2	159.6
	Commodities other than Farm Products and Foods[2]	161.5	159.2	145.0
	Wholesale Pulp and Paper[2]	173.4	167.1	156.5
	Purchasing Power of Dollar, Consumers Prices[1]	47.8	48.0	49.9
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	403.6	393.9	335.1
	Unemployment Compensation Initial Claims (M)	720	558	1,363
	Miscellaneous Carloadings–Thousands of Cars	1,673	1,963	1,277
	Electric Output (Million KW hr.)	34,307	32,650	28,169
PTJ	Average 32 P & P Common Stocks as of Dec. 19	$33.51	$34.94	$31.02
	Average Indicated Dividends Common Stocks as of Dec. 19	$ 2.23	$ 2.57	$ 2.31

[1] 1935-39=100 Unadjusted Index
[2] 1926=100
° For details see APPA Monthly Statistical Summary—October 1950 Estimated Figures
° Latest Month Available on Request

CLEAN PAPER GETS THE *PRICE*



ADAMS

WATER FILTRATION GETS THE *DIRT*

In kraft or tissue, book or newsprint—water quality is as critical as chip quality. No matter what grade of pulp or paper you make, sand, grit and pipe scale are expensive when they keep your product out of the top price brackets.

Water filtration with the fully automatic Adams Poro-Screen or Poro-Stone Filter takes out price-lowering impurities *before* they become part of the stock. Continuous backwashing effectively prevents clogging of filter elements—avoids costly, cumbersome cleaning operations.

Remember—in its early stages your product is about 98% water, and most water-borne impurities stay with the stock.

Find out what Adams filtration has done in situations like yours. Write for the new 20 page booklet on water filtration in the Pulp and Paper Industry, Bulletin No. 691.

R. P. ADAMS COMPANY, INC.

229 EAST PARK DRIVE, BUFFALO 17, N. Y.

News of the Week

ST. REGIS AWARDS CONTRACTS

St. Regis Paper Co. announces that Merritt-Chapman & Scott Corp., New York, has been awarded the general construction contract in connection with the company's recently announced expansion program in Florida.

The plans call for the early construction and installation of two kraft paper machines and pulp manufacturing facilities, one of which will be added to the company's "Kraft Center" at Pensacola, and the other in a new mill to be built at Jacksonville.

Merritt-Chapman & Scott Corp., active in a wide field of industrial, building, marine and heavy construction, has to its credit a long history of paper mill construction. It has been closely identified with the growth of the pulp and paper industry in the South, including construction of the paper mill and multiwall bag plant completed in 1948 which forms part of the St. Regis Kraft Center at Pensacola.

The new St. Regis projects will be under the direction of Myles C. McGough, vice-president of the company's Industrial and Building Construction Division, with A. A. Johnson serving as New York project manager. T. W. Wommack will serve as M-C & S project manager at Pensacola and W. Hohenhausen will serve in similar capacity at Jacksonville.

The order for the new paper machine at Pensacola has been placed with the Bagley & Sewall Co., Watertown, N. Y., and will be designed to produce specification multiwall kraft paper. The machine will be 228 inches wide and will be designed for an ultimate speed up to 2500 feet a minute.

The paper machine for the Jacksonville mill, which has been ordered from the Beloit Iron Works, Beloit, Wis., will be 230 inches wide and will also be designed for an ultimate speed up to 2500 feet a minute.

The two new paper machines, with a capacity of approximately 200,000 tons of kraft paper a year, will supplement St. Regis' present Southern capacity at Pensacola for making kraft paper and board and will be fully integrated with pulp manufactured from wood from the company's owned and leased woodlands.

Work has already commenced on the foundations for the new installation at Pensacola and a start on the new Jacksonville mill is expected to be made early in 1951. The site for the new mill at Jacksonville is well located in relation to the company's wood resources in the Suwanee Forest in Georgia.

The plans of the company for the Jacksonville mill call for a substantial expenditure for installation of the most modern developments in devices and equipment to eliminate or reduce to a minimum air pollution, odors and stream pollution.

ATLANTA PAPER GIVES BONUS

ATLANTA, Ga. — Christmas bonuses totaling $100,000 were distributed to all employes of the Atlanta Paper Co., it was announced by the management.

The company, which opened its new $1,500,000 plant at 950 West Marietta street, N.W., last January, reports it has enjoyed a rapid growth.

NEPCO EXPANSION

Nekoosa-Edwards Paper Co., Port Edwards, Wis., will launch a $4,500,000 expansion program shortly after the first of the year.

The 20-month program calls for additional warehouse space to improve customer service, to allow for longer machine runs and elimination of lost production time due to frequent grade changes on paper making machines, a new paper machine and the necessary building to house it, and additional power facilities and miscellaneous auxiliary equipment in connection with the new machine.

First unit in the program, on which work is planned to start in January, 1951, involves a new finished paper storage warehouse at the Port Edwards mill. The building is planned for completion by next fall. Of brick and steel construction to match the exterior of existing buildings, the new structure will provide 50,000 square feet of warehouse space and provide for 2500 tons of finished paper storage.

The building is to be located west of the finishing room and north of the present shipping room facilities, and will provide a straight line flow from both the finishing room for finished storage and from the machine room for roll storage, and be located adjacent to the shipping department where adequate truck dock and siding facilities already exist for speedy, economical shipment of orders.

The second important unit in the program is the installation of a new paper machine at the Nekoosa, Wis., mill of Nekoosa-Edwards. The new machine will replace the present No. 3 machine at the mill. The new equipment, which is estimated to be operating in 15 to 20 months, will increase production from that mill by 50 tons per day.

The machine will be equipped with a 180-inch wide wire. It will operate economically on quality production at a speed of 1200 feet per minute, and will produce a total of up to 140 tons per operating day, depending on the grades being run. Tonnage production will vary somewhat because of the versatile capacity of the machine in producing a variety of grades for special and specification purposes. The Pusey and Jones Corp., Wilmington, Del., will build the new machine.

Construction of a new building necessary to house the huge new equipment will begin shortly. The new building, of brick and steel, will be integrated with existing structures at the present site and will be located adjacent to the present Nekoosa machine room. Approximately 52,000 square feet of floor space will be required for the new equipment and it is planned to erect a 400 foot long by 65 foot wide structure with basement for the additional equipment.

Auxiliary equipment for the new machine, additional facilities for the power department, and other features necessary to fully capitalize on the productive facilities of the entire set-up will complete the program.

Reports now indicate that three new digesters for the Nekoosa kraft mill are well along and should be delivered, erected, and put into operation during the coming year.

Preliminary planning and research on the new equipment was made after many inspection trips to important mills in the country, and many months of intensive planning on the part of C. H. Reese, vice-president in charge of manufacturing, Burt Kassing, director of process and product development, C. C. Parvin, general superintendent, and other supervisory personnel in the manufacturing department.

Letter to Editor

In a recent article which appeared in the September 28 issue of the *Paper Trade Journal* under the title, "Engineering and Industrial Experiment Station, University of Florida," the activities of this Station's Pulp and Paper Laboratory and the University's School of Forestry were described and discussed at length. The fact that these two subdivisions of the University were linked under a single title may have given the erroneous impression that these two departments are operated as a single unit, which is true at some universities, but not at Florida.

The School of Forestry is entirely separate from the Pulp and Paper Laboratory and is a unit of the College of Agriculture. The Pulp and Paper Laboratory, on the other hand, is a unit of the Florida Engineering and Industrial Experiment Station, which is the research division of the College of Engineering, and the development laboratory for Florida industries. The function of the Station is to initiate and conduct projects in the several fields of engineering, and in industrial expansion, with particular emphasis on the development of new products from Florida raw materials, and assisting in the establishment of new industries in the State.

One of the many activities of the Station is contained in the Pulp and Paper Laboratory which is set up as a research center for the expansion and improvement of this growing industry in the South. It is equipped with both the men and materials needed to conduct both fundamental and applied research, and has already made great strides in the utilization of scrub oak — hitherto usable only as firewood. The industry may avail itself of the laboratory facilities through (1) sponsorship of research by individual companies or groups of companies, (2) establishment of Research Fellowships, (3) grants of equipment or funds for research, (4) participation in the trainee program for industrial workers. Equipment and activities of the laboratory were fully covered in the article under discussion.

Dean of the College of Engineering is Dean Joseph Weil, who is widely known for his contributions toward improving the quality of engineering education in the United States, and for his exceptional accomplishments in the field of electrical engineering, specifically in electronics and storm location. For four years during the war, Dean Weil was educational coordinator in the Adjutant General's Office.

Ralph A. Morgen is Director of the Engineering and Industrial Experiment Station and Professor of Chemical Engineering. Before joining the University Staff in 1938, Dr. Morgen spent twelve years in industry as consulting engineer and research manager for various companies. He holds patents in gas purification, detergents and machinery for the cleaning industries.

Heading the Pulp and Paper Laboratory staff of 12, are William J. Nolan and Wilson F. Brown, both holders of doctorate degrees in chemical engineering. Dr. Nolan has devoted the better part of the past four years in designing and supervising the installation of the Pulp and Paper Laboratory. Before joining the staff at the University of Florida, he was Professor of Chemical Engineering at the University of Maine for five years, and spent four years as a commissioned officer in the U. S. Navy.

Dr. Brown has just recently joined the staff of the laboratory. He spent twelve years as Chemical Engineer in charge of Development Work and Project Engineering for the Champion Paper and Fibre Company of Hamilton, Ohio, and has also been engaged in consulting work for other firms. Moreover, Dr. Brown is familiar with academic life, having taught chemical engineering at both Ohio State University and Kansas State College.

We trust that this brief outline of the organization of the forestry and pulp and paper research units will clear up any confusion that may have arisen.

Rachel Albertson, Editor
Engineering & Industrial Experiment Station
University of Florida
Gainesville

We are sorry to have caused this embarrassment and hope that the confusion is cleared up.—THE EDITOR.

BLUE SEAL CORP. SOLD

Carl H. Krause has purchased the Blue Seal Asbestos Corp. at 264 Wykoff street, Brooklyn, N. Y., and will function as its president. This company is one of the oldest fabricators of insulating parts in the country, having been founded in 1913.

SWINGLE HEADS NFTC

The National Foreign Trade Council announces on December 20 the election of William S. Swingle as president, to succeed the late Eugene P. Thomas. Mr. Swingle served as vice-president of the Council from 1938 to 1947, and since 1947 as executive vice-president.

ALBEMARLE EXPANSION

RICHMOND, Va.—The Albemarle Paper Manufacturing Co. announced on December 19 that it plans a $6,800,000 expansion of its plant at Roanoke Rapids, N. C.

Albemarle, which operates three plants in Richmond, said the expansion program would enable the company to double its production of Southern kraft paper.

The expansion will consist of the installation of a new, very large kraft paper machine and allied equipment capable of turning out 200 tons of paper a day.

This approximates the present production of Southern kraft paper by the four plants of the company.

Albemarle hopes to complete the expansion program at the North Carolina plant within approximately 18 months. The Roanoke Rapids plant, known as the Halifax Paper Co., Inc., is a wholly owned subsidiary of the Albemarle Paper Manufacturing Co.

The company official said the expansion of the North Carolina plant would create jobs for about 100 men there. Halifax Paper now employs from 400 to 500 persons.

LONGLAC SAWMILL PLAN

OTTAWA — Longlac Pulp and Paper Co. has announced that it has completed negotiations with the Ontario Provincial Government, Department of Lands and Forests, for the construction and operation of a permanent sawmill in Longlac, Ontario, with the plans calling for an establishment to cost several hundred thousand dollars.

The plant is intended to utilize the sawlog size timber developing from integrated operations to produce essential timber products. It is hoped full production will start in the spring of 1952 and that this undertaking will provide additional employment during the sawing season in the area, stabilizing the economic angle of the firm's operations as well as supplementing the company's present pulpwood harvesting operations for its pulp mill at Terrace Bay on Lake Superior.

SWEET BROTHERS SOLD

PHOENIX, N.Y.—R. W. Sweet, president of Sweet Brothers, has announced that the controlling interest has been sold to the Green View Tissue Corp., Empire State Building, New York City. The present Sweet Brothers management will remain in charge of operations.

Green View Tissue Corp. operates a converting plant at Putney, Vt.

It is expected that operations will be expanded as equipment becomes available.

STARCH FOR GREAT BRITAIN

WASHINGTON, D. C.—Starch totaling $1,344,000 was authorized for procurement by ECA this week, for export to Great Britain.

ABITIBI OFFICERS

Left to right:—W. H. Smith, C. B. Davis and R. J. Askin.

ABITIBI POWER & PAPER CO. LTD. has announced the appointment of W. H. Smith as executive vice-president of the company, C. B. Davis as vice-president (woodlands), and R. J. Askin as vice-president (manufacturing).

William Herbert Smith joined Abitibi in Montreal in 1914, was appointed treasurer in 1916, and assistant managing director in 1930. Associated with the company throughout its receivership, he was elected director and vice-president in 1946 when the new management assumed control.

Clark Bane Davis left the Forestry Service of the United States Government in 1919 to join Abitibi woods operations at Iroquois Falls, Ontario. He has been with Abitibi ever since, moving to the Toronto office in 1937. He was appointed manager of woodlands in 1943. He is a director of the Ontario Forest Industries Assn., a past chairman of the Woodlands Section of the Canadian Pulp and Paper Assn., and one of the pioneers of mechanical logging methods in Canada.

Robert James Askin started in the pulp and paper business with the old Fort William Paper Co. Ltd. in 1921 as a pulp tester. Appointed manager of this mill in 1930 shortly after its merger with Abitibi operations he was later appointed manager of the Thunder Bay Division. In 1942 he moved to Toronto as assistant manager of mills, succeeding T. E. Silver in 1943 as manager. He is a past councillor of the Engineering Institute of Canada and past chairman of the Technical Section of the Canadian Pulp and Paper Assn.

SULFUR SUPPLY

WASHINGTON, D. C.—Formal government action will be necessary to assure equitable distribution among domestic industry and maintain necessary exports to Marshall Plan and other friendly foreign areas, an industry conference was told the past week by NPA representatives.

Demand for sulfur will considerably exceed production, NPA officials were advised in turn by the industry spokesmen. A number of interested government agencies were reported to be studying the question of how much sulfur may be exported in 1951, to preclude undue hardship abroad where dependence is on the U. S. sources. Suggestions were advanced that foreign pyrite sources eventually can be developed as a substitute for sulfur but this is admittedly a long-range project.

NPA spokesmen warned it may be necessary to divert a quantity of sulfur to build up reserves, rather than permit 1951 consumption to equal production. Industry members reported the current reserves about equal a 5-months' supply.

SULFUR TO GERMANY

WASHINGTON, D. C.—German sulfur imports for the first half of 1950, recently reported by American sources, totaled 15,200 tons, of which the United States supplied almost the whole amount.

EXPORT CRITICAL SUPPLIES

WASHINGTON, D.C.—Critical copper, zinc and related products both from this country and from Canada, continue to be shipped out of the country, despite scarcity which has compelled drastic cuts to U. S. industrial users.

Typical of these shipments are the following ECA authorizations within the past week: to Western Germany, zinc and zinc-base alloys and zinc products, from U. S., $500,000; to Norway, copper and copper products, from U. S. sources, $350,000; to United Kingdom, zinc and zinc base alloys and related items, from Canada and U. S. A. sources, $3,192,000.

A substantial part of all ECA authorizations in the past 10 days has comprised heavy industrial goods, such as iron and steel mill materials and equipment of various kinds.

PEOPLE

COLUMBIA RIVER PAPER CO. announces the election of Nils G. Teren as president of the company and its subsidiaries, Oregon Pulp and Paper Co. and Columbia River Paper Mills.

GARDNER BOARD AND CARTON CO. has promoted Benson B. Martin to sales representative in charge of retail box sales in the New York office. Mr. Martin will replace Charles A. Lee, who has recently been promoted to manager of retail box sales with headquarters in the general office in Middletown, Ohio.

Mr. Martin joined the Carton sales staff of the Gardner organization a year ago. Previously he had been district sales manager of the Edwin J. Schoettle Co. in Philadelphia and was manager of special sales and production with the Chicago Carton Co. at their Chicago office.

HOLLINGSWORTH & WHITNEY CO. have elected W. Elliott Pratt, Jr., of Wellesley Hills, Mass., treasurer of the company effective December 31, 1950. Mr. Pratt has been a director of the company since 1939 and assistant treasurer since 1945. He succeeds Harry C. Thayer who is retiring on his sixtieth anniversary with the company, having been a director since 1918 and treasurer since 1927.

Dennis E. Cousins, mill manager at Mobile, Ala., since that mill began operation in 1940, was elected a vice-president, effective immediately.

Mr. Madden also announces that the directors have promoted Frederick Goodridge to assistant vice-president, Robert D. Robinson to assistant treasurer, George W. Brady to assistant controller – taxes, John J. Cleary to assistant controller – accounting, and William B. Borrebach to chief accountant.

WHITING-PLOVER PAPER CO., Stevens Point, Wis., has elected the following officers: F. B. Whiting, chairman of the board; George A. Whiting, president; Thomas Leech, vice-president and sales manager; A. J. Schierl, secretary-treasurer and general manager; Thomas A. Moore, assistant secretary and assistant treasurer. The above officers also comprise the board of directors.

JAMES L. KNIPE

UNION BAG AND PAPER CORP. announces the election of James L. Knipe to the board of directors of the company. Mr. Knipe, a member of the Union organization since 1947, is vice-president in charge of corrugated container sales.

Viscosity*

BY NEIL MAC COULL[1]

(Continued from December 21, 1950, issue)

PART II

Streamline Flow in Small Tubes—Efflux Viscometers

For measuring the viscosity of homogenous fluids such as oils, fluid flow by gravity through a capillary tube is one of the simplest methods, and can be accomplished with small samples of fluid.

For a fluid flowing through a capillary tube similar reasoning to the laminar flow between two plates, visualizes a series of concentric tubes of fluid moving past each other at velocities increasing with the distance from the wall of the enclosing tube as indicated in *Figure 7*. This type of flow was summarized by Poiseuille in the following equation which is frequently referred to as Poiseuille's Law:

$$\left\{\begin{array}{c}\text{volume}\\ \text{discharged}\\ \text{per second}\end{array}\right\} = \frac{(\text{tube diameter})^4 \times (\text{pressure})}{(\text{tube length}) \times K} \qquad (6)$$

The constant K in this equation incorporates the viscosity and the dimension units used. Note the large influence of small changes or errors in measurement of the diameter.

Observation of the time of flow of a fluid through any capillary tube may thus become a measure of its viscosity.

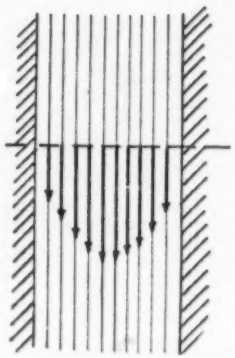


Figure 7—Schematic streamline flow of a fluid in a tube. Concentric tubular sections have increasing velocities from the tube wall to the center.

The converse is true also; the rate of flow of a fluid of known viscosity may be used as a measure of time. While we have more satisfactory means of measuring time nowadays, it should not be overlooked that this principle of an "inverted viscometer" was used quite generally by the ancients to measure time. It was the principle of the "Clepsydra" or water clocks such as shown in *Figure 8*, which were used in India and China about 2000 years ago, and in turn were believed to have originated in Babylonia or Egypt.

Poiseuille's simple equation was later expanded to account for the effects of individual dimensions,[7] in a form applicable to any case where a fluid flows by gravity and the rate of flow is determined by measuring the time required for the flow of a given volume. This may be expressed in the simpler form:

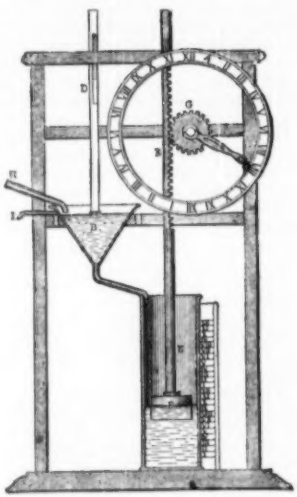
$$\frac{\text{abs. vis.}}{\text{density}} = A\,(\text{efflux time}) - \frac{B}{\text{efflux time}} \qquad (11)$$

in which time of flow is in seconds. The constants A and B apply to dimensions which are fixed for any one piece of apparatus and may be determined experimentally by testing with two or more fluids of different but known viscosities. Notice that if the time factor is large enough, the second term may be small enough to be neglected.

In all apparatus where liquid flow is caused by gravity, and in many other applications of formulae relating to viscosity, the ratio of viscosity to density generally occurs. This ratio is called *kinematic viscosity*. It is used so frequently that a characteristic unit has been defined as the *Stoke*, which is the ratio of viscosity in Poises, to the density at the same temperature. The *Centistoke* (abbreviated: cs) which corresponds to Centipoises, is coming into general use in the petroleum industry.

Commercial Viscometers

In commercial viscometry of lubricating oils, several efflux type viscometers which are somewhat similar to each other have been in general use for many years; Redwood in England,



Courtesy of The Macmillan Company. Reprinted from book by Dr. Willis I. Milham, entitled "Time and Timekeepers." Copyright 1923.

Figure 8—A Clepsydra or Water Clock used in ancient Greek and Roman times. It is really an "Inverted" Efflux Viscometer in which the flow of water from a constant level source measures time, instead of time being measured to determine viscosity.

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* Published with permission of the Texas Co.

[1] Technical and Research Div., The Texas Co., Beacon, N. Y.

[7] When flow is by pressure.*

$$\text{Poises} = \frac{\pi g r^4 t P}{8 V (L + \lambda)} - \frac{m V}{8 \pi t (L + \lambda)} \qquad (7)$$

Density ρ

Where: r = capillary radius in cm.
L = capillary length in cm.
V = Volume of flow in cm.³
t = time of flow in sec.
P = pressure causing flow in gms/cm.²
ρ = density in gms./cm.³
λ = a constant, generally = 1.12
m = "Couette correction" to length

For long capillaries, streamline flow, and velocities where kinetic energy correction may be neglected:

$$\text{Pressure} = \frac{1.82}{10^6} \text{Lr}\,\rho(\text{Avg. Shear rate})(\text{viscosity}) \qquad (8)$$

where: pressure causing flow is in lbs./sq. inch
viscosity is in cs

$$\text{Shear rate, avg.} = \frac{2v}{\pi r^2} = \frac{Q}{4.9 r^3} \qquad (9)$$

v = flow rate in cm/sec, and Q = volume flow in cm³/sec.

If flow is by gravity:

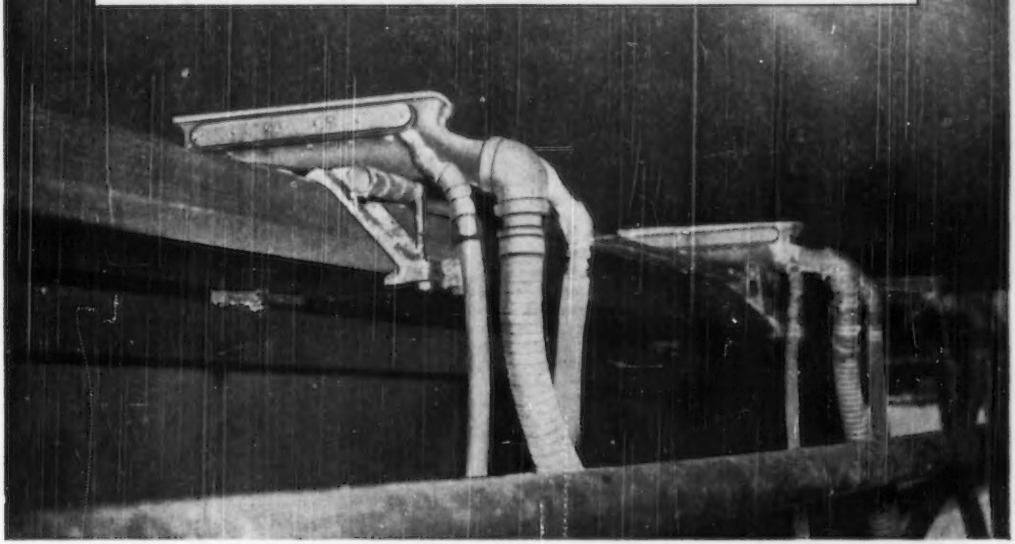
$$\text{cs} = \frac{38,500\, r^4 bt}{VL} - \frac{4.47\, V}{tL} \qquad (10)$$

where: b = height in cm

For a given instrument, this is equivalent to equation (11).

* Bureau of Standards, Scientific Paper #298, p. 65.

Today's Hard Working, Fast Running Press Felts
DEMAND
VICKERY FELT CONDITIONERS



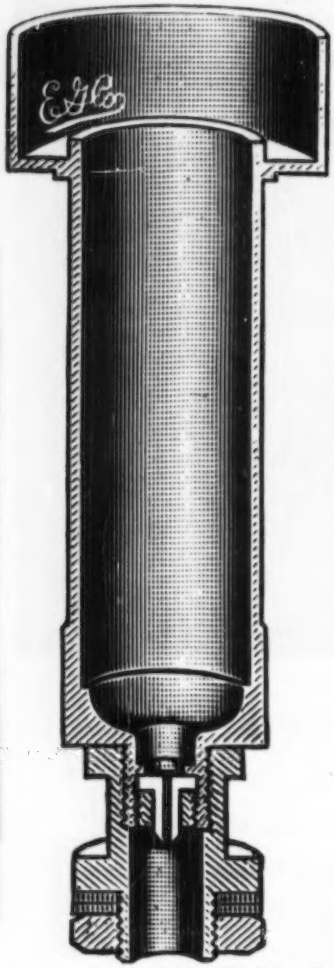
Has felt conditioning kept pace with felt operation in *your* mill?

Modern Vickery Felt Conditioners equipped with "Jordan" type vacuum boxes and high speed gear boxes keep the felts continuously clean and absorbent however fast they run. The heavy production losses caused by midweek shutdowns to wash clogged felts are eliminated once and for all.

Now, you need Vickery Felt Conditioners more than ever. Make sure your Conditioners are equipped to meet today's conditions.

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

Engler in Germany, Barbey in France, and Saybolt in the United States. With the exception of the Barbey, these are all very similar except in various dimensions and have the distinction of using relatively short capillary orifices. A description of the Saybolt will suffice for them all. *Figure 9* shows a section



Courtesy The Emil Greiner Co.

Figure 9—The Commercial Saybolt Viscometer Tube shown in section.

of a Saybolt viscometer tube, and *Figure 10*, a water bath in which it is usually assembled. The tube is made of brass, and when filled, holds about 70 cc of oil above the orifice.† Viscosity readings with this instrument are reported in terms of the time of flow in seconds, of 60 cc of oil. Uniformity of production instruments is obtained by close manufacturing tolerances and finally checking with two or three standardized oils of different viscosities.

The equation for the Saybolt viscometer as obtained from its designed dimensions has been calculated to be:[5]

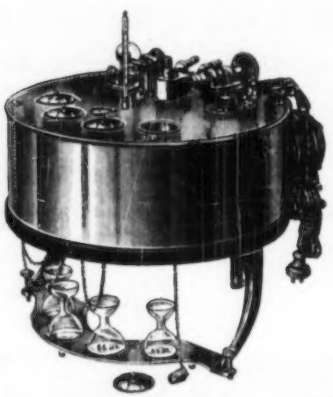
$$\text{Kinematic Vis. (Cs)} = 0.22\,t - \frac{180}{t} \quad \dagger\dagger(12)$$

This relationship may be expressed graphically on a chart such as *Figure 12*, which was published in *Lubrication* in April 1945, and was a revision of the similar chart developed by MacCoull and first published in *Lubrication* in May 1921. The revisions covered only the position of the Barbey line. These curves for all instruments shown were determined from carefully run tests on typical commercial instruments, with a series of liquids of known viscosity. Besides their use as a simple means of converting the readings obtained by these instruments into kinematic units, they have proven very useful in converting readings from one viscometer to another.

Several characteristics of the different instruments indicated on *Figure 12* should be mentioned here to explain the nature of these curves:

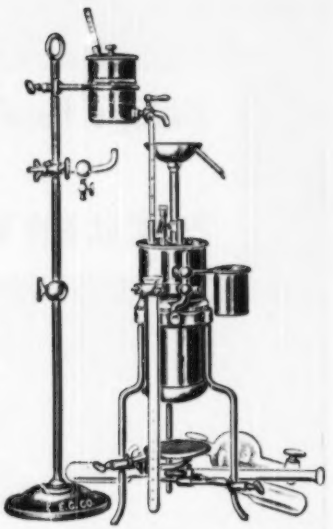
1. The Saybolt Furol is a modification of the standard Saybolt for testing high viscosity petroleum oils such as bunker fuels, with the orifice enlarged to 0.317 cm. It was the intention to have 10 times the flow rate and thus one-tenth the time of reading. The relation will be seen to approximate this intended value.

2. A similar condition exists between the standard Redwood instrument and the Redwood Admiralty.



Courtesy The Emil Greiner Co.

Figure 10—A typical constant temperature water bath for four Saybolt tubes. Electric heaters, a stirrer and thermostat assure uniform temperature.



Courtesy The Emil Greiner Co.

Figure 11—Barbey "Ixometer." Flow rate is determined by time required for a given volume at a fixed head. Because of a long flow tube restricted by a steel rod along its axis the flow rate is directly proportional to kinematic viscosity, from water to any higher viscosity.

3. Many commercial viscosity values taken on the Engler are expressed in terms of "degrees Engler," in which the efflux time of an oil under test is divided by the efflux time of water at 20°C. in the same instrument. The purpose is to reduce the differences in readings on different Engler instruments due to dimensional inaccuracies. This does not give a "specific viscosity" scale, which would be relative to the viscosity of water, because of the curvature of the conversion curve at low viscosities.

4. The Barbey "Ixometer" shown in *Figure 11* consists of a brass tube 5 mm in diameter and 20 cm long, containing a central rod 4 mm in diameter. Readings are reported as the oil flow rate in cc per hour, under a *constant gravity head* maintained by an overflow cup (though the actual readings consist of the number of cc of oil which flow in 10 minutes). Since the flow rate is expressed in volume per unit of time ("fluidity") instead of the inverse, time per unit of volume, the conversion curve shown in *Figure 12* slopes in the opposite direction from the other curves. Note that this is the only one of these instruments having a straight line relation between its readings and the kinematic viscosity of a liquid, over a range from water up. It would therefore appear that this might have the unique characteristic of a single calibration with water only (viscosity = 1 cp). However, the manufacturer has objected to the use of water because of the possibility of corrosion of the

† The flow of oil is accomplished by a gravity head of 12.50 cm at the start, and 2.22 cm at the time 60 cc have been measured in the flask under the tube, giving an average head of 7.36 cm. The orifice is 0.177 cm diameter (0.070") and 1.225 cm long (0.481"), having a ratio of length to diameter of a little less than 7. (Bureau of Stds. Tech. Paper #112, p. 7.)

†† Experience has indicated that these instruments as delivered are more satisfactorily represented by two different equations—one for efflux time below 100 seconds, and the other above 100 seconds.[6]

Tables are available for standardized conversions from Saybolt to Kinematic Viscosity. (ASTM designation: D446-39.)

[5] Bureau of Standards Tech. Paper #112, p. 19.

[6] API Proc., Div. of Refining, June 1932, p. 56.

MAKING FOUR LOGS DO THE JOB OF FIVE

Developed by the Pulp Division, Weyerhaeuser Timber Company, hydraulic barking at first was used only to de-bark West Coast Hemlock in sulphite pulp making at a saving of as much as 20% in useable pulpwood.

Hydraulic barkers are now used also on sawlogs. By hydraulically de-barking sawlogs, not only is the efficiency of the sawmilling operations improved but bark-free sawmill slabs and edgings can be processed into clean sulphate pulp.

Such integrated sawmill and pulp operations provide for an interchange of material in such a manner that the by-product of one operation becomes the raw material for another.

In this way, Weyerhaeuser assures increased and continuing supplies of wood for the Pulp Division and its customers.

PULP DIVISION

WEYERHAEUSER

internal steel rod. Each instrument when manufactured is adjusted by alteration of the height of the supply cup until a reference sample of rapeseed oil has a flow rate of 100 ml per hour at 35°C. Unfortunately various samples of any vegetable oil, such as rapeseed, vary with source and age so that different units which have been supplied by the manufacturer vary from each other, and there is some uncertainty as to what is a standard instrument. From tests on a number of these instruments in the United States, it appears that they should follow the equation:

$$\text{Kinematic Vis.} = \frac{5200}{\text{cc/hr}} \qquad (13)$$

which is the value indicated in the revised conversion chart shown in *Figure 12*.

All the viscometers represented in *Figure 12* have a straight line relation with kinematic viscosity above some limiting viscosity; about 50 cp except for the Saybolt Furol. Below this viscosity, the lines curve downward (except for the Barbey), and become very nearly vertical at 1 cp. This curvature comes in where the time of flow is small enough to make the second term of Equation (11) an increasingly important factor. The reason for this curvature is primarily the fact that an appreciable part of the energy available from the gravity head of the oil, instead of being used up entirely in overcoming the viscous resistance to flow, is expended in kinetic energy by giving velocity to the oil stream. This energy is a function of the velocity squared, and will be small enough to be ignored where the flow rate is restricted to more than 200 seconds on the Saybolt Universal but becomes increasingly important at lower viscosities. For higher viscosities, the following simple relation holds:

$$\text{Viscosity (Cs)} = K \times \text{(efflux time)}, \qquad (14)$$

where K is the instrument constant.

In *Figure 13* this constant is plotted against efflux time and clearly indicates the limitations to the use of a single instrument constant for viscosities above 200 seconds. For efflux times above 200 seconds, the constant K is 0.217 for oils at 100°F., and 0.7% lower for oils run at 210°F.[10] This correction is required primarily because of the shrinkage in volume of the stream of hot oil as it cools off in the measuring flask. This results in a

[10] ASTM Designation D446-39.

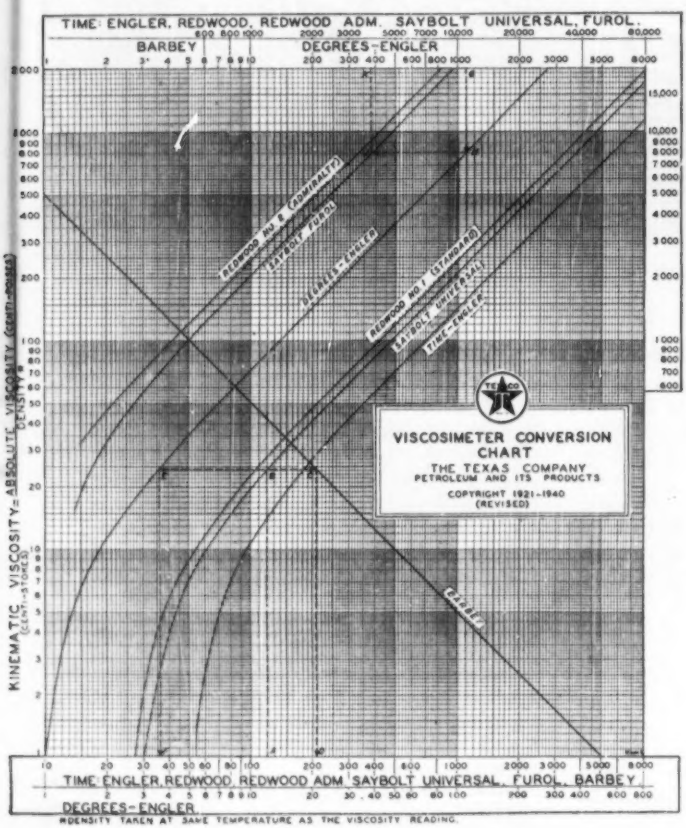

TIME ENGLER, REDWOOD, REDWOOD ADM. SAYBOLT UNIVERSAL, FUROL,
BARBEY
DEGREES-ENGLER
KINEMATIC VISCOSITY = ABSOLUTE VISCOSITY (cp) ÷ DENSITY @
VISCOSIMETER CONVERSION CHART
THE TEXAS COMPANY
PETROLEUM AND ITS PRODUCTS
COPYRIGHT 1921-1940
(REVISED)
TIME ENGLER, REDWOOD, REDWOOD ADM, SAYBOLT UNIVERSAL, FUROL, BARBEY
DEGREES-ENGLER
DENSITY TAKEN AT SAME TEMPERATURE AS THE VISCOSITY READING.

Figure 12

DIRECTIONS FOR USE OF CHART SHOWN IN FIGURE 12

OBJECT: To find the viscosity reading of a particular oil on any of the standard viscometers when its reading on one of the viscometers has been determined by experiment *at the same temperature.*

SCALES: There are two sets of scales which *must not be confused* with each other.

X: The scales at bottom and left hand side go together. They are the ones regularly used in practice applying to all ordinary oils.

Y: The scales at top and on right hand side go together. They are rarely used, applying only to very viscous products beyond the range of the other scales.

NOTE: There are two lines of scales at the bottom:

(a) The *lower* scale applies only to *degrees*-Engler.

(b) The *upper* scale applies to all other readings, including Engler-*time.*

In simply changing from one viscometer to another the scales at left and right are not used.

The scales at top must never be used in connection with those at the bottom.

APPLICATION OF CHARTS: X: For ordinary cases.

GIVEN: Saybolt Universal Viscosity = 120″.

DESIRED: Case (a) equivalent Barbey reading.

Case (b) equivalent Engler-degree reading.

PROCEDURE: Find point on bottom scales for Saybolt Universal corresponding to 120″ (A).

Follow up vertically to curve marked Saybolt Universal (the known instrument) (B).

(a) To get Barbey reading: Follow horizontally to curve marked Barbey (C).

Drop down to bottom scale for Barbey and read (D). Reading = 208°.

(b) To get Engler-Degree reading: follow horizontally to curve marked Degrees-Engler (E).

Drop down to *lower* of the two bottom scales, for Engler-Degrees and read (F). Reading = 3.60°.

i.e., 120″ Saybolt = Barbey 208° = Engler 3.60°.

Y: For very viscous fluids beyond range of other scales.

GIVEN: Engler-Degrees = 1100°.

DESIRED: Equivalent Saybolt Furol reading.

PROCEDURE: Find point on upper scales under Degrees-Engler Corresponding to 1100° (G).

Follow vertically down to Degrees-Engler curve (H).

Follow horizontally to curve marked Furol (J).

Rise vertically to scales under Furol and read (K). Reading = 3800″.

i.e., 1100° Engler = 3800″ Furol.

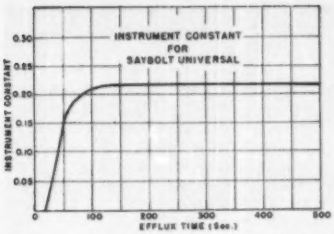


Figure 13—Instrument constant for Saybolt Universal Viscometer.

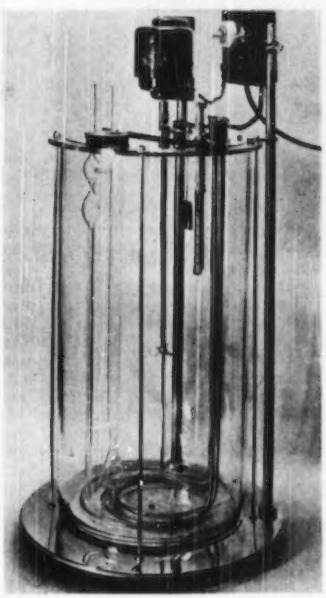
slightly greater volume flow through the orifice at high temperature than measured in the receiving flask which is at room temperature.

Fundamental Viscosity Measurements

Fundamental measurements of viscosity are calculated by formulae such as equations (7) to (10), from carefully measured dimensions of the capillaries used. Such measurements include not only the average diameters, by weighing the mass of mercury required to fill the tubes, but include complicated corrections for slight deviations of diameter along their length, from measurements by a suitable microscope of the length of a small section of mercury as it is moved from station to station along the bore.[11]

Also, consideration has to be given to a phenomenon connected with the entrance of the fluid into the capillary which increases its effective length. This may be discounted if the tube is so long that the entrance losses make up a negligible percentage of the results. Experimentally, tubes of different lengths are used and when the results are plotted against the tube length it becomes evident how long they must be to disregard these end effects. By such tedious methods, the absolute viscosity of water has been found, which can now be used as a primary standard to calibrate a master viscometer such as that shown in *Figure 14*, with a capillary tube long enough to neglect entrance effects. When the instrument constant has been found (equation 14) it may be used to calibrate oils which may then be used as secondary standards for the calibration of instruments suitable for routine viscosity readings.

[11] "A Monograph of Viscometry," Guy Barr, p. 60.
[12] ASTM Standardized Method No. D445-46T.



Courtesy of American Instrument Company

Figure 14—Fenske "Master" Viscometer and its constant temperature bath. This is a precision long-capillary Viscometer which may be calibrated with water, and used in turn to evaluate oil samples for calibrating Pipette Viscometers such as shown in Figure 15.

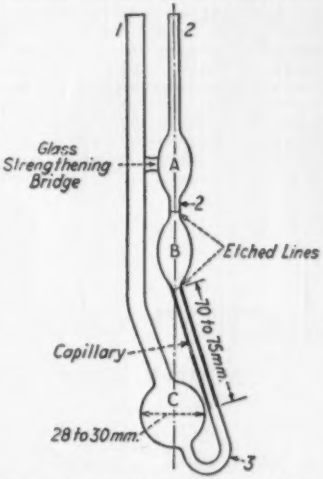
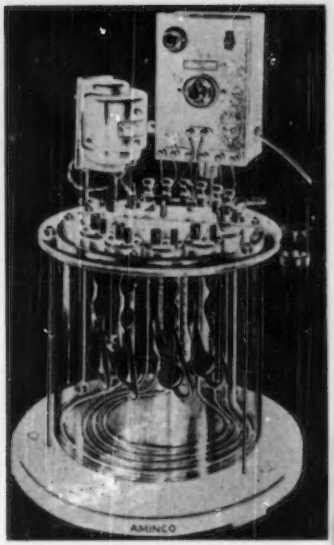


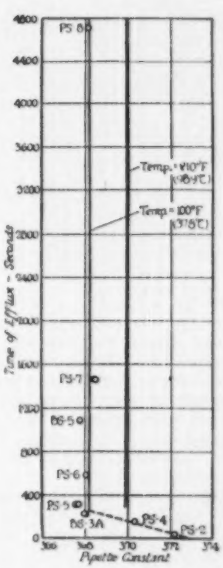
Figure 15—A.S.T.M. Modified Ostwald Viscometer.

It is now becoming general practice in the petroleum industry to use Fenske or Modified Ostwald Pipettes[12] such as shown in *Figure 15* for routine evaluations. A series of tubes is generally used having capillaries of various diameters for use with oils of different viscosities. A pipette is charged by inverting with the smaller tube (2) immersed in the oil to be tested, and then by means of a suction tube attached to the larger tube (1), drawing in oil to just above the line marked between the second bulb and the capillary section. It is then turned right side up and immersed in a constant temperature bath such as shown in *Figure 16*. After allowing enough time to assure that the oil has reached the bath temperature, the oil is drawn up to the bottom of the upper bulb by a suction tube, which is then disconnected, allowing the oil to flow by gravity down through the capillary. Time is measured for the meniscus to pass between the two etched lines.



Courtesy of American Instrument Company

Figure 16—Constant temperature bath for six Fenske Pipettes. An electric heating coil is shown at the bottom.



From Figure 3, "The Problem of the Viscosity of Lubricants," by Fenske and McCluer, API Paper, May 24, 1934

Figure 17—Instrument constant for a Fenske Pipette. The constant here is the reciprocal of the constant used in the text. Thus:

$$\text{Pipette Constant} = \frac{\text{Efflux Time}}{\text{Kin. Vis.}}$$

Check readings may be taken on the same oil without removing the pipette. The elapsed time is then converted into kinematic viscosity by multiplying by the instrument constant of the particular pipette used.

The original calibration for any pipette is based on the fact that it is used only in the range where the following equation holds:

$$K = \frac{\text{centistokes}}{\text{efflux time}} \qquad (15)$$

The constant K may obviously be determined by running one or more oils of known viscosity, calibrated on some instrument such as the Master Viscometer shown in *Figure 14*. To determine the range over which this constant holds, a plot such as *Figure 17*[13]

[13] Figure 3 of "The Problem of the Viscosity of Lubricants", Fenske & McCluer, API, Proc. Div. of Refining, May 1934, p. 31.
* See Part III, next issue.
[14] ASME Trans. 63 #4 (May 1941), p. 359. "Relationship of Viscosity to Rate of Shear."

may be made, which indicates that the pipette tested should not be used for viscosities which will have an efflux time less than about 400 seconds.

Rate of Shear

In practically all instruments used for the measurement of viscosity (efflux or torsion) the rate of shear between the imaginary layers of a fluid when tested is much lower than often occurs in machines where these fluids are used in commerce. This has been necessitated in order to avoid the instrumental complications which would result if the fluid flow were up in the turbulent* range. It is quite natural that a question should arise as to whether a fluid will have the same viscosity at very high shear rates as at the shear rates where it is customarily measured. This is a difficult question to answer satisfactorily because of the heat generated in the oil film at high shear rates. In even very thin films, the temperatures may be appreciably higher near their center than where they are in contact with their encompassing surfaces.

A few years ago some experimental data were reported[14] from a special torsion viscometer with slightly tapered cylinder and cup which permitted runs with very thin oil films. The result proved that typical commercial lubricating oils, marketed as motor oils, do not change in viscosity for any shear rate up to the limits tested, which were more than 300,000 as expressed by equation (3) in which the value is spoken of as "reciprocal seconds." There is still some reason to suspect that some special types of oil may lose viscosity at high shear rates, and a forthcoming report of a subcommittee appointed by the API to investigate this matter will be awaited with interest. *(To be continued next week)*

The Selection of a Pulper*

JACOB V. EDGE[1]

I would like to discuss for a few minutes the design and application of pulpers and to just scratch the surface of the theory of stock disintegration.

As you perhaps know, my company, for the past several years, has gone quite deeply into this subject and has found some remarkable facts.—*Author's Note.*

The prime object of a pulper is disintegration of stock, that is, tearing it up until it is suitably small to pass on to a refining operation. This tearing apart operation is accomplished by two factors: namely, (1) mechanical disintegration as accomplished by the action of the impeller, and (2) the hydraulic disintegration accomplished when one fast moving body of stock and water passes by another body of stock and water. Bundles of fibres that are caught between these two flows are pulled apart very forcibly.

To achieve very best results, a pulper must use both factors to the greatest possible extent.

In order to get the paper stock back on the impeller frequently and positively, the tub shape must be properly designed. A beater will reurn stock to a beater roll positively but not frequently, therefore, the relatively long beating time required. Some pulpers will act frequently on stock but not positively, as some stock gets most of the treatment while other stock is just moved around. What is needed in a pulper is a means of definitely channeling all the stock back over the impeller time and time again. In the speed of this return to the impeller largely lies the efficiency of a pulper.

To get the maximum amount of hydraulic disintegration, a pulper must be designed so as to create fast moving bodies of stock which oppose each other. In any pulper, the stock near the impeller is moving faster than stock not so near the impeller. This movement causes hydraulic disintegration, but not enough for a truly efficient pulper.

Hydraulic disintegration should be carried all the way to the top of the pulper tub in as many oppositely moving bodies of stock and water as is possible. This travel is most important as we feel that a very large percentage of the work done on a stock is done by hydraulic disintegration. To my mind at least, this concept is proven by the fact that when a radius was put in the bottom of a vertical tub-type pulper the efficiency of that pulper, with everything else the same, went down to half what it was before the effort was made to "streamline" the tub.

It also is felt that stock in a vertical tub-type pulper will separate into many layers; the bottom layer, being near the impeller, moves at the highest rate. The middle sections move at slower rates; the top layer, at a still slower rate. Therefore, if a pulper will return the stock which is visible on top to the impeller rapidly, think how much more work is being done to the bottom layer where action is so much greater.

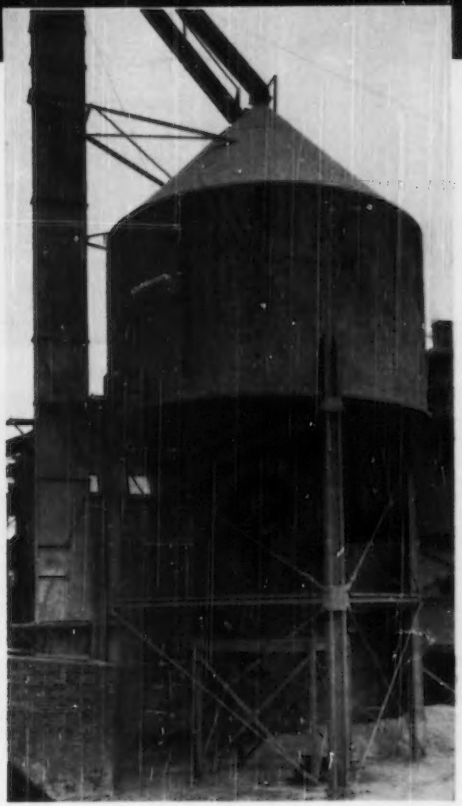
These requirements are met by a 3- or 4-lobed design of tub. This tub, when viewed from above, gives a clover-leaf appearance. Each lobe of the tub generates its own stream of stock which, in turn, feeds back positively over the impeller as well as gives infinitely more area where hydraulic disintegration may take place.

To carry this subject of hydraulic disintegration a bit further, it is felt that refining should largely replace the common practice of jordaning. When old papers or broke are being treated, each fiber has already been cut to a proper length for forming into an acceptable sheet. Therefore, the only problem in handling these stocks is to get them separated into individual fibers. It's true in the case of old paper, too, that many varieties of fiber are found, some too long for the forming job which has to be done. Such stock may entail limited jordaning but it should be very limited.

The correct procedure is to put hydraulic disintegration back to work in a refiner. Here bars pass by each other with no bar to bar contact — making it impossible to cut a fiber, yet the many bars and the high speed create tremendous hydraulic disintegration. In this manner, fiber is separated from fiber so that individual long fibers are obtained rather than small chunks of matted-together short fibers as is possible with a jordan.

[1] Sales Engineer, Downingtown Mfg. Co., Downingtown, Pa.
* Presented at the 1950 Fall (joint) meeting of the Southeastern and Southern Divisions of the American Pulp & Paper Mill Superintendents Assn., on October 12-14, at the George Vanderbilt Hotel, Asheville, N. C.

Georgia mill uses Horton* structures in expanding capacity 100 per cent



THE St. Mary's Kraft Corporation recently expanded the pulp producing capacity of its mill at St. Mary's, Georgia, from 250 to 500 tons per day—an increase of 100 per cent. The mill converts slash pine into pulp and manufacturers kraft paper for shipping sacks, wrapping and other paper products.

Horton* steel plate structures were used extensively in this expansion program. We furnished eight digesters, several liquor storage tanks, a 15,000-bbl. fuel oil tank, a chip tank, a blow tank, a salt cake tank and a lime storage tank.

An extensive installation like this proves that we know how to build the specialized processing equipment and storage tanks used at paper mills. Our shops do welding, x-raying, and stress-relieving to code requirements. Corrosion-resistant linings can be furnished when required. Write our nearest office for a quotation when you need heavy steel plate work of any type.

Two of the Horton structures installed in connection with the expansion of the St. Mary's Kraft Corporation mill at St. Mary's, Georgia, are shown above. They are (left) 28-ft. diam. by 16-ft. salt cake storage tank and (right) 12-ft. diam. by 10-ft. lime storage tank*

*Trademark Registered in U. S. Patent Office

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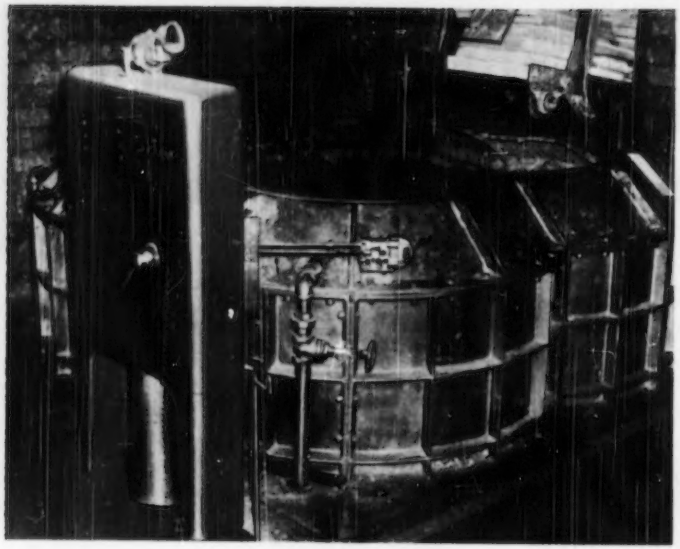
Atlanta, 3.....2142 Healey Building
Birmingham, 1.....1559 North 50th Street
Boston, 10.....1064-201 Devonshire Street
Chicago, 4.....2130 McCormick Building
Cleveland, 15.....2255 Guildhall Building
Detroit, 26.....1565 Lafayette Building
Houston, 2.....2163 National Standard Building
Havana.....402 Abreu Building
Los Angeles 17..1561 General Petroleum Building
New York 6.....3333-165 Broadway Building
Philadelphia, 3..1665-1700 Walnut Street Building
Salt Lake City, 4.....547 West 17th South Street
San Francisco, 4.....1577-200 Bush Street
Seattle, 1.....1368 Henry Building
Tulsa, 3.....1666 Mount Building
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE
In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.



Four-Lobed Downingtown Pulper.

Another requirement for a good good pulper is evenness of particle size upon discharge. It stands to reason that an individual fiber is going to get different treatment in subsequent refining or jordaning than will a piece of paper an inch or two square.

Since each fiber should receive the same treatment in the refiner as every other fiber, the stock discharged from a continuous pulper should be extracted through as small sized holes as possible. This extraction has been done very successfully with ¼ in. diameter holes. (Holes ⅛ in. in diameter also can be used.) Only very well pulped stock can go through such holes. In the case of an old paper pulper, it means that a great many more pieces of dirt and strings are kept from the accepted stock.

With this small hole size has come the problem of keeping extraction plates clean and getting the required tonnage through them. It is not sufficient to trust to the violent action of the stock in the tub to keep them clear. Rather it is being done through the use of a simple eccentrically-operated diaphragm located in back of the extraction plates. The action of this diaphragm shakes the stock through the extraction plates much as the diaphragm of a screen shakes fibers through screen plates.

The size of a pulper tub is of great importance. A 10 ft. diameter vertical tub pulper contains approximately 500 cubic feet. At 6 percent consistency, the full tub holds 2000 lb. of pulp; at 3 percent, it holds 1000 lb.

This tub, if properly designed and with stock properly fed to it, can deliver 125 tons of mixed paper pulp per day. To put it another way, the discharge would equal 173 lb. per minute or one complete tub full in 5¾ minutes at 3 percent consistency.

It seems impossible, doesn't it?

The stock would be discharged from such a unit through ¼ in. or 3/16 in. holes at uniform consistencies.

An 8 ft. unit is producing 75 tons per 24 hours continuously; a 12 ft. unit, at the rate of 150 tons in a batch operation in 70° water.

The problem of obtaining uniform stock consistency from any pulper operation depends on uniform feed of stock and dilution water. In the case of stock, uniform feed can best be obtained by use of a slow moving conveyor. Bales of pulp or paper can be put on the conveyor, the wires cut, and the feed rate adjusted to the bale size and output tonnage. Uniform dilution water feed can be obtained by use of a calibrated water regulating valve.

With 1500 lb. bales of paper and a desired output of 100 tons, the feed rate on the conveyor would be approximately 4½ in. per minute. This uniform feed of stock not only insures uniform consistency but also permits automatic pulper operation at maximum efficiency and uniformity of power load.

The drive is mechanical, yet it can give a superintendent a good many headaches. It is felt that a direct-connected vertical spiral bevel gear unit with a direct-connected motor is the best setup. The gears should be overdesigned for long dependable service and to take care of shock loads. The packing around the impeller shaft should be carefully designed for efficiency and for ease of maintenance.

The temperature in a pulper is critical, more so on some stock than on others. The speed of pulping a batch of hard-sized solid kraft linerboard can be doubled by raising the temperature from 50°F. to 140°F. So temperature is one question which should be answered before getting an accurate tonnage figure on a contemplated pulper installation.

The diameter of the impeller as well as the shape, height and angle of the blades can vary the operation of a pulper all the way from excessive horsepower with little fiber disintegration to moderate horsepower and excellent defibering. It is even possible to get excessive action and good circulation in a pulper, yet poor defibering. The number of impeller blades above a certain maximum has little effect on horsepower requirement or defibering.

The use of broke pulpers is becoming increasingly popular. This popularity will increase still further when mills realize that a pulper set in a mill basement can be arranged to take all broke, trim and slabs from one or more paper machines and can be operated solely by push buttons by a back tender or winder crew. This arrangement will eliminate the men now on old broke beaters. It also will save horsepower and time for cleaning up around old beaters and for maintaining them.

The finishing room in a good many mills is a place where a pulper could be installed to do away with the laborious job of carting broke and trim back to the beater room.

Don't be afraid of pulpers on tough applications. It is possible to do a very good pulping job on wet strength papers by using high temperatures and by controlling the pH. I recently witnessed the complete defibering of hard-sized ¼ in. thick kraft shoe counterboard in one-fourth the time necessary in a beater; also using half the horsepower. Asbestos brake lining stock likewise pulped with little difficulty; also cooked straw fiber was very well disintegrated.

So you see, you have no need to hold back from a pulper installation because your stock is tough.

To sum up the requirements of a perfect pulper, it should have the following features:

(1) Tub should be shaped to positively channel stock back over impeller rapidly, time after time.

(2) Tub should be arranged to take full advantage of hydraulic disintegration not just at impeller, but all the way up side of tub to top of stock.

(3) Stock should be extracted through the smallest holes possible to make it suitable for later refining, yet holes must be kept positively clear of obstructions.

(4) Proper materials of construction and proper design of drive are very important.

(5) Pulpers should be designed for use in many locations, such as in machine rooms and finishing rooms, thus saving electric power and manpower, also doing a better job.

(6) In general, the theory of hydraulic disintegration should be used in later refining operations.

Coosa River Mill Supplies Southern Newsprint For Southern Papers

J. W. HUGHES[1]

Shortly after the close of World War II, a group of citizens of Talladega County, Alabama, retained the firm of J. E. Sirrine Company, consulting engineers of Greenville, South Carolina, to determine what type of industry could best take advantage of the geographical location and natural resources offered by the county. In addition to a location fairly central to most of the southern markets, and convenient to an excellent transportation network, the county boasted large stands of pine forests and an ample water supply in the Coosa River.

These features were "naturals" for a paper mill, and so came into being the 32-million dollar ultra-modern Coosa River Newsprint Mill at Coosa Pines, Alabama. Located in the gently rolling country about 40 miles southeast of the city of Birmingham, the Coosa River Mill is producing approximately 350 tons of newsprint and 150 tons of fully bleached pulp daily. The newsprint supplies the complete requirements of a large number of newspapers, while the fully bleached pulp is shipped to other mills for conversion to paper tissues and similar products.

Figure 1—View of causticizing and bleach liquor preparation plant showing section of rotary lime kiln. Portion of pulp wood stockpile visible in background.

Streamlined Efficiency—Theme of Mill Instrumentation

Since the entire mill—from the air conditioned office building, to the shipping department, was carefully designed with a view toward maximum efficiency, it was decided that over-all instrumentation (involving more than 800 instruments), would follow the same trend. In order to obtain centralized grouping of chart records of closely related variables, and yet supply operators with convenient indication of variables critical to the operation of their equipment, and the means for adjusting these variables when necessary, a combination of master control cubicles of the panel type and individual operator cubicles of the console type was utilized. All of these cubicles were received at the mill completely wired and piped, with instruments, gauges and accessories mounted. Consequently, installation was materially simplified.

Both master recorder cubicles and individual operator cubicles can be seen in the accompanying views of the bleach plant and the brown stock washer room. In general, pertinent variables are permanently recorded by the instruments on the master cubicles, and indicated on the dial-type gauges on the consoles. The latter also include necessary push-buttons and rheostats for starting, stopping and varying the speeds of pump and washer drive motors, and manual loading stations which permit the operator to regulate remotely located valves.

Pneumatic Transmission Gives Wide Flexibility

Pneumatic transmission of instrument readings is largely responsible for the success of the system of instrumentation used. For example, in the brown stock washer room, the hot water showers to the third stage washers are automatically controlled by indicating flow transmitters located near the points of measurement. Flow readings are transmitted pneumatically both to receiving recorders on the main washer panel, and to indicating dial gauges on the console type cubicles mounted alongside the washers. The latter gauges also incorporate set point indicators which show the set points of the remotely located transmitter-controllers, and means for adjusting these set points.

[1] District Mgr., Brown Industrial Div., Minneapolis-Honeywell Regulator Co.

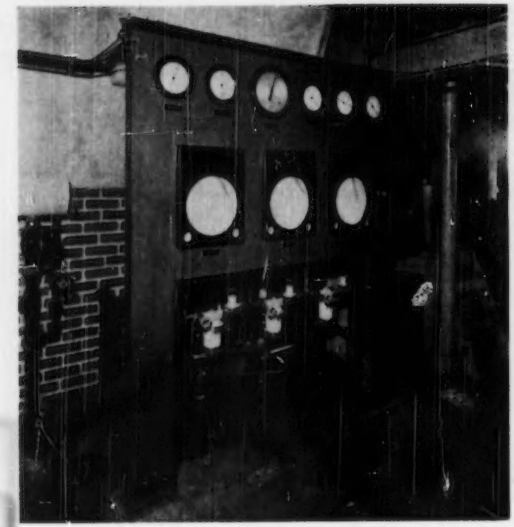


Figure 2—Secondary control cubicle in recovery plant. Recording controllers, left to right are: primary and secondary heater temperature controllers, and liquor level controller for cascade evaporator.

Figure 3—Two lines of three-stage brown stock washers, showing console type control cubicles. Section of main washer cubicle in background. Variables indicated on consoles are recorded on main cubicle.

When the operator wishes to increase the flow of shower water, he adjusts a knob below the indicating dial. Movement of this knob repositions the set point indicator on the dial, and changes the amount of air pressure applied to an index-setting bellows in the remotely located transmitter-controller. Resulting bellows movement shifts the set point index the desired amount upscale and the controller consequently increases the flow of shower water. The important thing is that the operator can make any necessary adjustments without leaving the console which is immediately adjacent to the washer.

A dial type gauge on the main bleach plant cubicle indicates the level in the bleach liquor storage tank, and serves as another example of the versatility of pneumatic transmission. This gaugeis unique in that it is separated from the point of measurement by 900 feet of tubing. An instrument on the main causticizing plant cubicle (which incidentally forms one wall of the control room) continuously records this same level.

Efficiency and Quality Closely Allied with Instrumentation

The large number of measuring and controlling instruments used in every department of the mill precludes the possibility of covering over-all mill instrumentation in an article of limited length. Suffice it to say that industrial instruments are utilized wherever they can: (1) aid skilled operators in achieving maximum production and quality; (2) relieve these operators of monotonous routine tasks; or (3) guard essential process equipment against breakdown, with resulting costly down time. A few typical applications selected at random from various mill departments will serve to illustrate some of the ways in which instruments are employed at the Coosa River Mill.

Controllers Aid in Maximum Chemical Recovery: Shown mounted on the secondary recovery room cubicle are

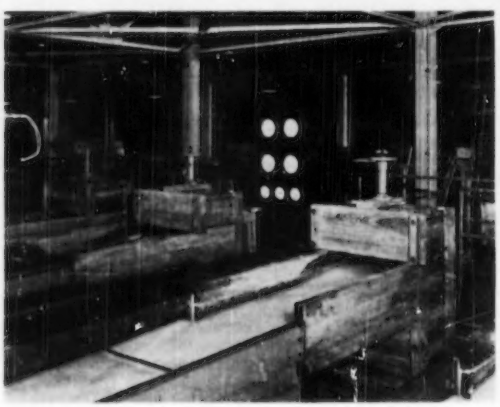


Figure 4—Main recorder cubicle and control console in screen room. Recorders show levels of three stock chests, and flow of fully bleached stock to flat screens. Latter instrument controls flow by means of Saunders Patent valve.

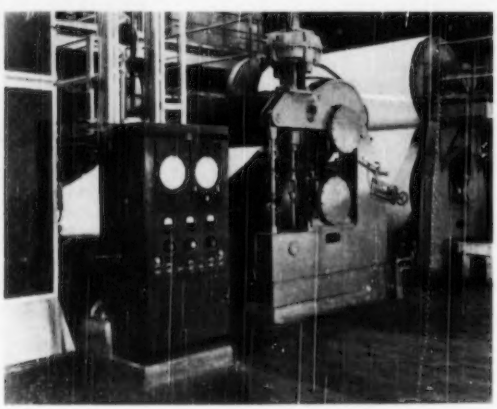


Figure 5—One of two control cubicles on pulp dryer. Instruments record steam flow and control steam pressure to dryer. Push-buttons and rheostats control speeds of three sections of dryer.

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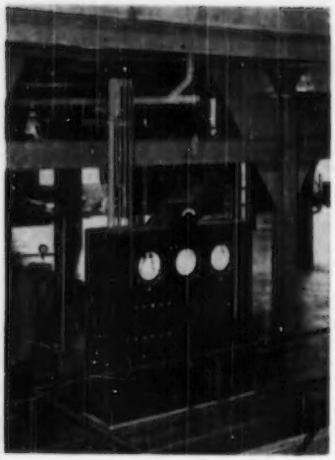


Figure 6.—One of two control cubicles on wet end of paper machine. Left to right, instruments are: tray collector level controller, head box and birdscreen level recorder, and stock temperature controller. Push-buttons and rheostat are for machine auxiliaries; manual diverting valves for fresh and white water.

three instruments which aid in salvaging the maximum amount of chemical in the recovery furnace. Although all three are thermometer controllers, one functions as a level controller to maintain a uniform liquor level in the cascade evaporator. The other two controllers insure that the concentrated black liquor reaches the recovery furnace burners at a temperature which will provide most efficient atomization.

Torque Recorders Help Prevent Damage to Rakes: Torque recorders on the main causticizing plant cubicle continuously record the torques on the rakes in both the green and white liquor clarifiers. An alarm bell sounds if either torque exceeds the maximum allowable limit. Result — protection from snapped shafts and costly down time.

Controller Holds Baumé of Green Liquor Constant: One of the instruments on the main recovery room cubicle assures a flow of uniform Baumé green liquor from the dissolving tank. This instrument continuously samples the Baumé of the liquor in the tank and throttles the flow of liquor leaving the tank to hold this Baumé at the desired value. Another control instrument measures tank level and controls level by throttling the flow of weak wash water to the dissolving tank.

Flexible Measurement of Black Liquor Flow to Recovery Furnace: A series of four Brown area meters piped in parallel measure black liquor flow to the recovery furnace. These meters are connected to a recorder on the main recovery room cubicle so that this instrument can be made to record: (1) liquor flow to any one of four burners, or (2) total flow to all four burners.

Blow Tank Consistency Controller: ElectroniK instruments on the main brown stock washer cubicle automatically control consistency of the stock in the blow tanks. Control is based on a measurement of the power consumed by the blow tank agitator drive motors which will vary with stock consistency. The controllers throttle the admission of dilution liquor to the blow tanks to maintain the desired consistency.

ElectroniK Instruments Meter Stock Flow: Instruments on both the main brown stock washer and the main bleach cubicles meter stock flow to the washers. These instruments, graduated 0 to 100 per cent of stock flow, operate as tachometers, and are actuated by small generators driven from the shafts of the stockmeter drive motors.

Air Purge or Bubbler Type Level Measurement on Bleach Towers: There has been much discussion regarding the advisability of using this type of level measurement on stock of relatively high consistency. At the Coosa River Mill this system is found to be entirely satisfactory for stock consistencies up to 19 per cent. Although the recorder pen does not draw a perfectly straight line, the resulting chart record clearly shows the level trends within the various towers.

SUPPLIERS

E. D. JONES & SONS CO. formally opened their new plant with an employe family night open house.

The plant has been completed at a total cost of more than $50,000. The Jones company purchased the one-story brick building for $15,500. New machinery and construction work on the project made up the rest of the total.

Heading the 10-man crew at the plant is Paul Pierce, newly promoted to foreman. Mr. Pierce has been with the company 15 years. If business continues its upward swing employment at the plant may be double by late winter or early spring.

NATIONAL STARCH PRODUCTS, INC., announced that Donald D. Pascal has been named vice-president in charge of sales. Mr. Pascal has been vice-president of the company in charge of Eastern and Pacific Coast Sales Divisions. His headquarters will be in New York City.

C. H. WHEELER MFG. CO. has announced the appointment, effective December 1, 1950, of F. L. Yetter as senior vice-president. In 1946 he was elected vice-president and assistant general manager.

The C. H. Wheeler Mfg. Co. now joins Economy Pumps, Inc., Klipfel Manufacturing Co., Liberty Planers, Inc., and Smith & Mills Co. as a division of the Hamilton-Thomas Corp.

WORTHINGTON PUMP AND MACHINERY CORP. of Harrison, N. J., announced the acquisition of Wintroath Pumps Inc., of Alhambra, Calif., and stated that the Wintroath Co. will operate as a wholly owned subsidiary of Worthington, continuing under present management with Boyd Kern remaining as president.

HONEYWELL BROADENS COURSE

Customer employe courses that will be fitted to specific requirements of each of its industrial instrument users will be opened January 8 at the Philadelphia school of the Minneapolis-Honeywell Regulator Co.

The new courses will cover industrial instruments maintenance and repair. The classes will be held on a three, five and 13 weeks basis. The shorter courses will be for concentrated instruction, the longer courses for more comprehensive training in complete industrial instrumentation.

The three-week courses will start on January 8, March 26 and April 30. They will include training in pyrometry, ElectroniK potentiometers and pneumatic automatic control and transmission. The five-week classes, starting February 12 and May 28, will include the same subjects, also flow meters, thermometers, pressure gauges and hygrometers.

The comprehensive 13-week course, to be held from February 12 to May 11, will include instruction on millivoltmeter-type pyrometers, continuous balance (ElectroniK) potentiometers, electrically-operated automatic control, flow meters, thermometers, pressure gauges, hygrometers, air-operated automatic control, Moist-o-Graphs, tachometers, resistance thermometers, gas analysis, pH and conductivity instruments.

LIFTS IMPORT CONTROLS

OTTAWA—The Department of Trade and Commerce has formally announced that all import controls on capital goods, including heavy machinery needed to equip plants, will be lifted completely on January 2, due to the improvement in the foreign exchange position of the Canadian Government which reports reserves of U. S. dollars jumped from a low of $500 million to an all-time high of $1,800 million.

However, it is forecast that such imports from U. S. may be curbed by the abnormal conditions expected to prevail in 1951 and the growing shortages for civilian production.

SWEDISH NAVAL STORES

WASHINGTON, D. C.—Swedish liquid rosin exports just reported for the first 6 months of 1950, totaled 5,426 metric tons.

Turpentine oil exports amounted to 1,413 tons, and of wood tar, 3,385 tons. The final breakdown on naval stores figures showed exports of refined tall oil totaled 1,834 tons in 1949, with Czechoslovakia, the United Kingdom and Poland as the chief markets.

Financial News

American Brake Shoe Co.'s Board of Directors at the meeting held December 13, 1950 declared a common stock dividend of 10%, at the rate of one share for each ten common shares held, in addition to a cash dividend of 50c and a special year-end cash dividend of $1 per share on the common stock. These dividends are payable to common stockholders of record at the close of business on December 19. The cash dividends totalling $1.50 per common share will be mailed to stockholders on or about December 27.

The certificates for the 10 per cent common stock dividend will be mailed on January 10. Cash payment will be made in lieu of script for fractional shares.

The common stock dividend of 10 per cent involves the issuance of approximately 99,556 additional shares of common stock, less the aggregate of the fractional shares which will be paid in cash.

The Board of Directors also declared the usual quarterly dividend of $1 per share on the outstanding 4 per cent cumulative preferred stock, payable December 27, 1950 to stockholders of record on December 19.

Cash dividends on the common stock total $3 for 1950.

Minnesota and Ontario Paper Co. declared a quarterly common stock dividend of fifty cents per share to stockholders of record at the close of business on December 29, 1950 payable on January 25, 1951.

Rayonier Incorporated declared a regular dividend of 50c per share and an extra dividend of 25c per share on the Common Stock, both payable February 15, 1951 to stockholders of record January 19, 1951.

Dryden Paper Co., Ltd., has declared a dividend of 40 cents, payable February 1 to stockholders of record December 30.

Price Bros. & Co., Ltd., has declared a dividend on new common stock of 75 cents, payable February 1 to stockholders of record January 15.

Mersey Paper Co., through Royal Securities Corp., Montreal, is offering at par an issue of 50,000 4½ percent cumulative redeemable $100 par preference shares.

The shares are a block purchased from shareholders and do not represent new financing. They were issued to common shareholders as a stock dividend on the basis of three preferred shares for each 10 common held. Creation and issue of 59,308 preferred shares for this purpose was approved by common shareholders at a special meeting, as part of a plan to capitalize the company's earned surplus.

Prospectus in connection with the offering shows nine months' earnings this year of $2,368,902, only slightly below the record $2,476,187 net profit for the full year in 1949. Prospectus states that the company proposes to issue a further 9,915 preference shares early in 1951. When the total amount outstanding reaches the authorized $7 million annual dividend requirement will be $315,000.

Fraser Companies Ltd. reports that it will redeem 15,000 4¼ percent preferred shares as early as possible in the new year. Announcement is to be made shortly.

Bathurst Power and Paper Co., Ltd., has declared a dividend of $1 per share on Class B stock and another 50c on Class A plus extra $1, payable March 1 to stockholders of record February 1.

STOCK REPORT

	Per Share Earnings			
PREFERRED STOCKS	Calendar Year 1949	12 Mo. to Approx. 9/30/50	Indic. Annual Divid. Rate	Dec. 26 Approx. Market Price
Armstrong Cork Co. $3.75 Cum.	$40.95*	$48.14a	$3.75	$100⅞
Armstrong Cork Co. $4.00 Cum Conv.	40.95*	48.14a	4.00	113½
Celotex Corp. 5% Cum.	6.80c	8.75a	1.00	15½
Champion Paper & Fibre $4.50 Cum.	60.09f	97.99	4.50	105⅛
Container Corp. of Amer. 4% Cum.	89.52	122.92	4.00	105
Crown Zellerbach $4.20 Cum.	54.38e	66.87	4.20	103½
Dixie Cup Co. $2.50 Cum. Conv. Cl. A	10.93	13.70	2.50	52½
Flintkote Co. $4 Cum.	62.70	79.70	4.00	104¾
Robert Gair Co., Inc. 6% Cum.	13.79†	17.21†	1.20	19
International Paper Co. $4 Cum.	224.55	323.40	4.00	107½
Kimberly Clark Corp. 4% Cum.	85.27	124.87e	4.50	108
MacAndrews & Forbes 6% Cum.	61.59	63.03	6.00	141½
Mead Corp. 4¼% Cum.	51.37	88.30	4.25	93⅜
Mead Corp. 2% Cum. Conv. 2nd	21.35*	36.20*	2.00	58½
Pabco Products, Inc. 4% Cum. Conv.	56.46	124.88	4.00	100¾
Rayonier Inc. $2 Cum.	9.54	17.45	2.00	35⅛
St. Regis Paper Co. 4.40% 1st A	30.74	52.38	4.40	94½
Scott Paper Co. $3.40 Cum.	51.15*	62.16*	3.40	98½
Scott Paper Co. $4.00 Cum.	51.15*	62.16*	4.00	106½
Sutherland Paper 4¼% Conv.	46.92	68.59	4.25	113¾
U. S. Gypsum Co. 7% Cum.	283.37	429.37	7.00	184½
United Wallpaper Inc. 4% Cum. Conv.	2.14	(d)17.15	2.00	23⅞
West Virginia Pulp & Paper 4½% Cum.	61.28e	61.06i	4.50	109⅜
COMMON STOCKS				
APW Products Co.	(d)0.81	0.45	—	6½
American Writing Paper Corp.	.04	0.86	0.50	8½
Armstrong Cork Co.	6.57	7.84a	3.75	46
Celotex Corp.	1.65e	2.20a	1.00	14½
Certain-Teed Prods. Corp.	2.84	3.43	1.50	14
Champion Paper & Fibre	5.15f	8.93	2.45	45½
Congoleum Nairn Co.	3.04	2.70a	2.00	22½
Container Corp. of America	4.23	5.14	2.50	30⅜
Crown-Zellerbach	6.02c	7.36	2.20	46⅞
Dixie Cup Co.	7.44	9.87	1.50	44⅛
Eastern Corp.	0.04	3.04	1.00	19½
Flintkote Co.	4.33	5.48	3.00	24⅛
Robert Gair Co., Inc.	2.11†	2.69†	0.70	11¾
Great Northern Paper Co.	4.87	3.73	3.00	44½
International Paper Co.	7.12	8.65	2.50	49½
Johns-Manville Corp.	4.83	6.38	3.50	47½
Kimberly Clark Corp.	5.29	6.81e	1.80	44⅝
MacAndrews & Forbes Co.	3.64	3.74	3.00	42
Marathon Corp.	3.29c	4.84e	1.40	37½
Mead Corp.	4.10	7.32	2.20	23½
National Container Corp.	0.95	2.00	0.75	10¾
Pabco Products, Inc.	0.85	1.95	0.60	16⅜
Rayonier, Inc.	4.75	9.73	2.50	47⅜
Ruberoid Co.	7.93	8.65	3.18	47¾
St. Regis Paper Co.	0.91	1.63	0.60	11⅜
Scott Paper Co.	6.07	7.12	3.60	44⅞
Sutherland Paper Co.	4.62	6.47	2.75	43½
Union Bag & Paper Corp.	5.01	6.68	3.00	36½
United Board & Carton	(d)1.61b	1.56j	0.50	17½
U. S. Gypsum Co.	13.51	17.87	10.00	101½
United Wallpaper	(d)0.01	(d)0.57	—	3½
West Virginia Pulp & Paper	8.58e	8.36i	5.00	74⅛

(a) 12 months to approximately 6/30/50
(b) Year ended 1 /13/49
(c) Year ended 1/31/50
(d) Deficit
(f) 9 months to 12/31/49
(h) Declared 25c payable Sept. 1, 1950
(i) 12 months to 7/31/50
(j) 12 months to 11/11/50
(*) Earnings per combined preferred shares
(†) Includes domestic and Canadian subsidiaries and 60% equity in Southern Paperboard Corp.

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Most orders accepted, however, at price prevailing on date of shipment. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports

Rolls, contract, per ton $105.00/110.00
Sheets .....

F.o.b. Mills, C.l. Frt. allowed, dock, N. Y.

Kraft— pr cwt., 40# base wgt.

Standard Wrapping Rolls ..... $7.75/ —
No. 1 Wrapping Rolls 8.25/ 8.50
Standard Bag ..... 7.50/ —

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs or more

Wh. No. 1 Frd. ..... $1.85 /$2.50
Wh. No. 1 MG ..... 1.85 / —
Wh. No. 1½ ..... 1.75 / —
Wh. No. 2 ..... 1.65 / —
Kraft Non-Tar ..... 1.70 / —
White Non-Tar .....

Toilet— per case of 100 rolls—1 M sheets

Unbleached 4½x4½ ..... $8.00/$8.25
Unbleached 4½x5 ..... 6.05/ —
Bleached 4½x4½ 7.10/ 8.80
Bleached 4½x5 ..... 9.10/ —

Per Case of 50 rolls—2000 sheets

Unbleached 4½x4½ ..... $8.00/$8.25
Bleached 4½x4½ ..... 6.95/ —

Per Case of 100 rolls—1000 sheets

Facial, 4½x5, 2 ply ..... $8.95/$9.85

Paper Towels— per case of 3750

Wh. Jr. M'tif'd 9¼x9½ $5.65
Br. Sr. M'tif'd 10x12 ..... 4.00
Br. Jr. M'tif'd 9½x9¾ 3.50
Br. Jr. Sgl. fold 10x10¼ 3.35
Blchd. 7½x11, 24/25 rolls $6.00/7.00

Manila, per cwt.

No. 1 Jute Tag sheets* $16.55/18.55
Reg. Jute M.F. 40-lb., sheets* 15.00/17.00
Wrapping Manila 8.75/ 10.50
Printing Manila 10.50/12.00
* Less usual allowance for rolls.

WORLD WOOD PULP MARKETS

Fourth Quarter Contract Prices, Per Short Air-Dry Ton

	Varying freight allowances		Atlantic Ports		
	U. S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$85.00/100.00	$85.00/100.00			
Sulphate, Bleached	135.00/200.00	175.00/ —	180.00/ —		Competitive
Sulphate, Unbl. Northn.		140.00/155.00	153.00/165.00		
Sulphate, Unbl. Southn.					
Sulphite, Blchd. (Sftwd.)	135.00/165.00	145.00/ —	179.00/ —	Competitive	Competitive
Sulfite, Blchd. (Hdwd.)	150.00/175.00	132.50/150.00			
Sulphite, Unblchd.	132.50/150.00		157.00/ —		
Sulphite, Unbl'd (Glassine)		140.00/142.50			
Soda, Blchd.	140.00/142.50				

* On dock. † Delivered.

Gummed Tape— per bdl., 500 bdls. or more

90-lb. 375 ft. GSI ..... $6.90 / —
60-lb. 600 ft. GSI ..... 6.90 / —
35-lb. 800 ft. GSI ..... 7.93½/ —
35-lb. 500 ft. GSO ..... 5.98 / —

Boards, per ton—

Filled News $102.50/107.50
Plain Chip 105.00/107.50
Blchd. Mla. Ld. Chip 132.50/147.50
White Pat. coated .020 ..... 155.00/170.00
Kraft Liners 42 lb. 115.00/117.50
Kraft Corr. .009 ..... 122.50/126.00
Binders Boards 137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Ctns. per cwt.
100% Rag Ex. No. 1	$70.45/ —
100% Rag	62.45/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ —
25% Rag	29.75/ 30.00

Ledgers	4 Ctns. per cwt.
100% Rag Ex. No. 1	$72.65/ —
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ —

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Ctns. per cwt.
Watermarked	$19.05/$19.85
Plain	18.05/ —

Ledgers	4 Ctns. per cwt.
Watermarked	$21.15/ —
Plain	19.35/ —

White Book

Conversion Coated	Case per cwt.
No. 1	$23.40/$24.65
No. 2	21.90/ 23.40
No. 3	21.15/ 22.40
Machine Coated	
No. 1	$18.15/ —
No. 2	16.15/ —
Uncoated	
No. 1 Antique (Watermarked)	$19.15/ —
Offset	17.90/ —
A Grade E. F.	17.40/ 18.15
A Grade S. C.	18.15/ 18.65
B Grade E. F.	17.65/ —
B Grade S. C.	18.40/ —

‡ Indicates a price change.

WASTE PAPER MARKET

The following quotations were gathered from major dealers in each market. They are an indication of the price range in which volume tonnage was moving on the date specified. Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) ALL PRICES NOMINAL. SPOT OFFERINGS OR SPECIAL PACKINGS NOT INCLUDED.

	New York	Philadelphia	Boston	Chicago
	Dec. 21	Dec. 22	Dec. 18	Dec. 12
No. 1 Mixed Paper	$32.00/ 35.00	$30.00/ 33.00	$29.00/ —	$33.00/ —
Boxboard Cuts	30.00/ 33.00	23.00/ 28.00	25.00/ 30.00	38.00/ —
Mill Wrappers	30.00/ 35.00	25.00/ 35.00	30.00/ 35.00	35.00/ —
No. 1 News	37.00/ 40.00	33.00/ 36.00	33.00/ 35.00	38.00/ —
Over-issue News	40.00/ 45.00	32.00/ 40.00	33.00/ 40.00	41.00/ —
Corrugated Containers	55.00/ 62.00	50.00/ 53.00	49.00/ 55.00	52.00/ —
New Corrugated Cuts	55.00/ 62.00	45.00/ 48.00	49.00/ 60.00	62.00/ —
Double Kraft Ld. Corr. Cuts	100.00/110.00	90.00/ 95.00	110.00/120.00	120.00/ —
100% Kraft Corr. Cuts	175.00/140.00	110.00/120.00	125.00/135.00	135.00/ —
Used Kraft Bags	85.00/ 95.00	60.00/ 70.00	85.00/ 95.00	65.00/ —
No. 1 Brown Kraft Paper	90.00/ 95.00	70.00/ 80.00	85.00/100.00	65.00/ —
Super Resorted Br. Kraft	100.00/105.00	85.00/ 95.00	95.00/105.00	90.00/ —
New Br. Kraft Env. Cuts	160.00/175.00	130.00/135.00	160.00/175.00	150.00/ —
New Br. Kraft Cuts	150.00/180.00	125.00/ —	140.00/160.00	140.00/ —
No. 1 Gdwd Shvs.	80.00/ 85.00	75.00/ 80.00	85.00/ —	75.00/ —
White Newsblanks	110.00/120.00	105.00/110.00	110.00/125.00	115.00/ —
No. 1 Flyleaf Shvs.	80.00/ 85.00	90.00/ 95.00	95.00/105.00	110.00/ —
No. 1 Soft Wht. Shvs.	175.00/190.00	170.00/175.00	175.00/195.00	175.00/ —
Super Soft Wht. Shvs.	190.00/200.00	180.00/ —	185.00/200.00	190.00/ —
Hd. Wht. Shvs.	185.00/205.00	185.00/195.00	190.00/200.00	180.00/ —
Hd. Wht. Env. Cuts	200.00/235.00	195.00/210.00	200.00/220.00	190.00/ —
New Manila Env. Cuts	140.00/150.00	125.00/ —	140.00/150.00	115.00/ —
Col. Tab Cards	90.00/105.00	100.00/110.00	95.00/120.00	100.00/ —
Manila Tab Cards	150.00/170.00	160.00/170.00	160.00/180.00	165.00/ —
No. 1 Mixed Ledger	95.00/100.00	85.00/ 90.00	90.00/100.00	100.00/ —
White Ledger	125.00/135.00	110.00/115.00	115.00/125.00	125.00/ —
No. 1 Book & Mag.†	45.00/ 50.00	30.00/ 35.00	40.00/ 50.00	35.00/ —
No. 1 Rep'd. Hvy. Books‡	55.00/ 65.00	50.00/ —	45.00/ 50.00	55.00/ —

* Delivered. † Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood.

RAG MARKET

New Domestic Cotton Cuttings
(Prices to Dealers, F.o.b. Ship. Pt.)

ALL PRICES NOMINAL

No. 1 White Shirts	$19.00/$20.00
No. 1 Unblchd. Muslins	19.00/ 20.00
Blchd. Canton Flannels	16.00/ 17.50
No. 1 Lt. Silesias	12.00/ 13.00
No. 1 Lt. Prints	9.00/ 10.00
Wht. Bk. Blue Overalls (Blchable)	13.00/ 13.50
No. 1 Blue Overalls	7.00/ 9.00
Fancy Shirts	6.00/ 6.50
No. 1 Washables	5.00/ 5.50
Suntan Khaki Cuts	9.00/ —
Mixed Khaki Cuts	7.00/ 8.00
Corduroy Cuts	4.50/ 5.00
Cottonades	4.50/ 5.00
Blchd. Underwear Cuts	20.00/ 21.00
Unblchd. Underwear Cuts	19.00/ 20.00

Old Domestic Cotton Rags
(Prices to Dealers, F.o.b. Ship. Pt.)

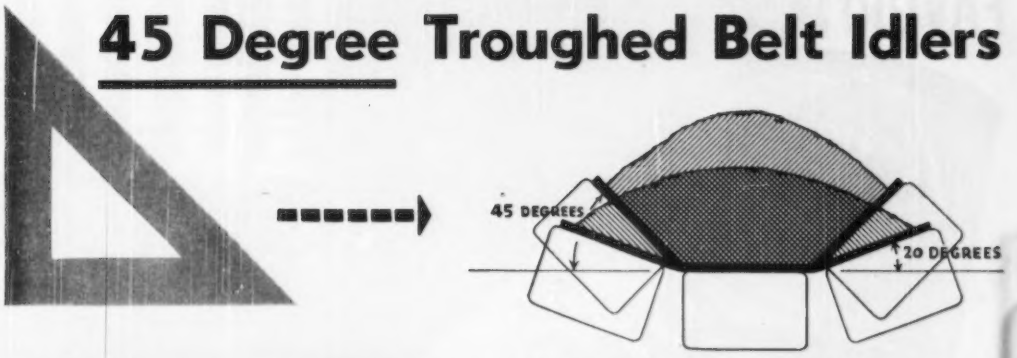
ALL PRICES NOMINAL

	Per 100 lbs.
Mixed White	$4.50/$5.00
Cotton Pants & Overalls	3.75/ 4.25
Thirds and Blues, Repacked	3.50/ 3.75
No. 1 Roofing Rags	2.40/ 2.50
No. 2 Roofing Rags	2.30/ 2.40
No. 3 & 4 Roofing Rags	2.20/ 2.30
Roofing Bagging	2.20/ 2.30

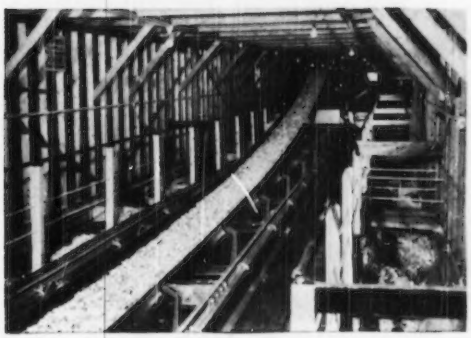
New Foreign Cotton Cuttings
(Prices to Mills, F.o.b. Dock, N.Y.)

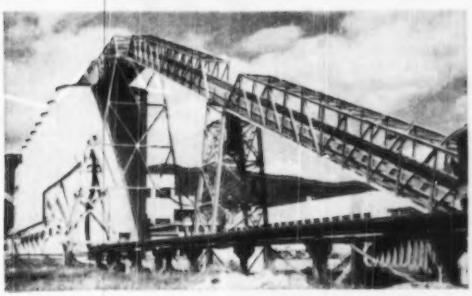
	Per 100 lbs.
New Dark Cuttings	$4.25/$4.75
New Mixed Cuttings	4.50/ 5.00
Light Silesias	7.50/ 8.00
Light Flannelettes	7.50/ 8.00
New White Cuttings	nominal
New Unbleached Cuttings	nominal
Fancy Shirt Cuttings	6.00/ 7.00

More Capacity from the Same Belt with LINK-BELT 45 Degree Troughed Belt Idlers



Note the difference in cross sectional area of material carried — which determines conveying capacity — by two belts of equal width, one troughed at 20 degrees and the other at 45 degrees.





This recent Link-Belt Belt Conveyor installation at a pulp mill employs idlers with end rolls sloping at 45 degrees to support the 24 inch wide belt carrying wood chips to gallery over storage silos where they are discharged by a traveling tripper.

This line of troughed belt idlers has been developed to provide increased capacity and prevent spillage when incorporated in common belt conveyor applications for the lighter bulk materials — a natural outgrowth of Link-Belt's extensive experience in this field and constant search for improvements upon standard practices. Because they have proven themselves by giving excellent service in many installations, there is a definitely growing trend toward the use of these deep-trough roller bearing idlers for conveyors handling granular materials.

Link-Belt 45 degree Troughed Belt Idlers are available in two styles. The center roll and the two end rolls are all of equal length in Series 400 Idlers, while Series 500 have a center roll appreciably longer than the two equal end rolls. Many belt widths may be accommodated by either series. Belt training idlers are also available in all sizes of both series to prevent injurious belt misalignment.

Let Link-Belt engineers show you how 45 degree troughed belt idlers will increase the capacity of a given belt or enable a narrower belt to carry a given volume of such materials as wood chips, grains and other similar materials.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in Principal Cities. 12,198

LINK-BELT

BELT CONVEYOR EQUIPMENT

IDLERS • TRIPPERS • BELTS • PULLEYS

BEARINGS • DRIVES

CORROSION PLAYS NO FAVORITES

You must PROTECT OR PAY ...you have no other choice

No business escapes the effects of corrosion. It costs industry over $6,000,000,000.00 annually. Yet much of this costly damage might be avoided by taking just two simple steps –

1. Check the danger points in your plant–manufacturing equipment, piping, valves, tanks, motors, and all similar items.
2. Protect them with Amercoat–the corrosion-resistant coatings; each designed to meet specific conditions.

Most conventional coatings fail when corrosion threatens, because they are neither designed nor suited for severe service. Don't risk needless loss–protect now with Amercoat.

6-50a

AMERCOAT CORPORATION
A Division of
American Pipe and Construction Co.
4809 Firestone Blvd., South Gate, California

Light Prints	6.00/ 7.00
Bleachable Khaki, No. 1	5.50/ 6.00
Unbl. Khaki, No. 1	4.50/ 5.00

Old Foreign Rags

(Prices to Mills, F.o.b. Dock, N. Y.)

	Per 100 lbs.
No. 1 White Cottons	$6.50/$7.50
No. 2 White Cottons	5.50/ 6.00
No. 3 White Cottons	4.00/ 4.50
No. 4 White Cottons	3.50/ 3.75
Extra Light Prints	4.50/ 5.00
Old Light Prints	4.00/ 4.25
Med. Light Prints	3.50/ 3.75
Dutch Blue Cottons	3.75/ 4.00
Checks and Blue	3.00/ 3.50
Linsey Garments	2.75/ 3.00
Dark Cottons, European	2.25/ 2.50
Dark Cottons, Egyptian	2.15/ 2.30
Old Shopperies	2.10/ 2.25
New Shopperies	2.25/ 2.50

Bagging

(Prices to Dealers, f.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny	$7.00/$8.00
Domestic Gunny, No. 1	6.75/ 7.25
Heavy Wool Tares	6.75/ 7.50
Foreign Manila Rope	4.25/ 4.50
Domestic Manila Rope	5.75/ 6.50
Jute Strings	6.25/ 6.50
No. 1 Sisal Strings	3.50/ 4.25
Mixed Strings	nominal
Paper Mill Tares	5.25/ 5.75
No. 1 Scrap Burlap	
Foreign	4.75/ 6.00
Domestic	5.50/ 6.50
Austr. Wool Pouches	7.50/ 8.00
New Burlap Cuttings	7.00/ 7.50

MATERIALS

Aluminum, sulfate:		
coml. bags, wks. cwt.	1.65	
iron-free c.l.	3.25	
Alcohol, ethyl:		
tax free, dms. c.l. gal.	.62	/ .97
deld. East Miss.		
Alcohol, methyl:		
Synthetic, Zone 1 dms. c.l. fit. alld. gal.	.41	
Casein, acid-prec.:		
dom. sh. pt. c.l. lb.	.39	/ .42
imp. ex dock lb.	.39	/ .40
Caustic soda:		
c.l. wks. solid, 76%, cwt.	3.35	
flak. & grd. 100-lb. drums	3.75	
liquid 50% tanks	2.55	
liquid 70% tanks	2.65	
China clay:		
dom. air-float. filler, c.l. wks. ton	10.00	
water-washed	11.00	
coating	16.00	/30.00
imported, ex whse. short ton	15.20	/28.35
Chlorine:		
single-unit tanks, works. cwt.	2.70	
multi-unit cwt.	3.20	/ 4.40
Formaldehyde:		
USP, inh. dms, c.l. wks. lb.	.0600/	.0625
l.c.l. E. wks	.0650/	.0675
Fuel oil:		
Bunker C, No. 6 Cal. hvy tanks, refinery bbl.	1.95	/ 2.15
light bbl.	2.05	/ 2.10
Hydrogen peroxide:		
USP, 35% cbys. E. of Miss. lb.	.24½/	.25½
Lime:		
hydrated, bags, wks. Buffalo ton	13.50	
Rosin:		
B gum, drms, c.l. Savan. cwt.	8.00	
G, H, I, K cwt.	8.13	
FF, wood, do. cwt.	7.30	
Rosin size:		
70%, gum & pale grds, tank cars, south, sh. pt. cwt.	6.80	/ 7.00
Salt cake:		
dom. bulk, c.l. wks. ton	17.00	
wks. frt. all. ton	20.00	/22.00
Soda ash:		
light, 58%, bags, wks.	1.50	
bulk cwt.	1.20	
Sodium silicate 40°:		
turbid, c.l. wks. cwt.	1.20	
l.c.l. wks.	1.55	/ 1.95
Sodium peroxide:		
dms. c.l. E. of Miss. lb.	.19	
l.c.l. do. lb.	.19½/	.20
Soybean, protein:		
chem. isol, wks. c.l. lb.	.24	/ —
Cinn. and Chic.		
Sulfuric acid:		
60° Be. cbys. cl. wks. cwt.	1.75	/ —
l.c.l. wks. cwt.	2.05	/ 2.60
Sulfur:		
crude, c.l. mines, contract, long ton	21.00	/22.00
f.o.b vessels Gulf	22.50	/23.50
Export, f.o.b. Gulf	25.00	
Sulfur dioxide:		
liquid, coml. cyl. wks. lb.	.09	
multi-unit cars lb.	.0535	
Starches:		
pearl corn, bags, c.l. Chic. cwt.	5.72	/ —
white dextrines, c.l. Chic. cwt.	7.09	/ —
potato, Idaho, c.l. wks. cwt.	5.50	/ —
potato, Maine, c.l. wks. cwt.	5.25	/ —
tapioca, conv. dextrines cwt.	7.50	/ 8.00
medium grds. Gulf and East Coast ports	6.75	/ 7.50
low, Siam, on dock N. Y.	5.00	/ 5.50
	nominal	
Talc:		
domestic, 50-lb. sacks, c.l. wks. ton	25.00	/30.00
Titanium dioxide:		
anastase, c.l. deld., bags. lb.	.21	/ .21½
l.c.l. deld. lb.	.22	/ .22½
rutile, c.l. deld. lb.	.23	/ .23½
l.c.l. deld. lb.	.24	/ .24½

N.B.: For special market conditions, see *Trends*.

IMPORTS

IMPORTS AT NEW YORK

Week Ending Dec. 23

Newsprint

News Syndicate Co., Elin Hope, Baie Comeau, 7771 rolls.

(———), Markland, Liverpool, N.S., 2337 rolls; 4169 rolls (Alexandria).

Madden Reeve Angel & Co., Inc., Tidaholm, Rauma, 49 rolls.

Wallboard

Elof Hansson, Inc., Tidaholm, Gothenburg, 320 bls.

J. H. Schroeder Banking Corp., Selma Thorden, Hernosand, 1372 bls.

Boxboard

Jay Madden Corp., Tidaholm, Rauma, 1131 bls., 51 rolls (folding).

Wrapping Paper

(———), American Ranger, Havre, 43 cs. (cellophane).

Lamont Corliss, American Ranger, Havre, 1 pkge. (cellophane).

American Express Co., American Ranger, Havre, 1 pkge. (cellophane).

Jay Madden Corp., Tidaholm, Rauma, 184 rolls (sulphite), 179 rolls (sulphate).

Resolute Paper Products Co., Tidaholm, Rauma, 258 rolls (sulphite).

Van Oppen & Co., Aagtedyk, Rotterdam, 395 bls.

Paper Corp. of U. S., American Traveler, Glasgow, 78 bls.

Paper Napkins

American Express, Rosa Thorden, Gothenburg, 96 ctns.

Freund Mayer, Rosa Thorden, Gothenburg, 3 ctns.

PULP

PAPER

Perkins-Goodwin Co.

Established 1846

CHICAGO, ILLINOIS

30 ROCKEFELLER PLAZA, NEW YORK

LUFKIN, TEXAS

STOCKHOLM, SWEDEN

Printing Paper

S. H. Pomerance Co., Exemplar, Genoa, 18 cs.
H. Reeve Angel & Co., Inc., Vardulia, London, 1 cs.

Cardboards

Johanson Wales & Sparre, Inc., Selma Thorden, Hernosand, 2463 bls.

Decalcomanies

Polish American Supply Co., Batory, Gdynia, 3 cs.

Greaseproof Paper

Bleyco Paper Corp., Aagtedyk, Rotterdam, 45 cs.

Bristol Boards

A. de Vries Co., Aagtedyk, Rotterdam, 42 bls.

Stencil Paper

Elliott Addressing Machine Co., Pioneer Mail, Kobe, 45 ctns.

Wallpaper

Z. F. Crosby, American Producer, Bremen, 8 bls.
Hudson Shipping Co., American Ranger, Havre, 4 cs.
E. Miltenberg, Pioneer Mail, Shimidzu, 5 cs.
C. A. Haynes Co., Britannic, Liverpool, 469 ctns.
Taub Hummel & Schnall, Britannic, Liverpool, 796 ctns.
Hudson Shipping Co., America, Southampton, 5 cs.
J. E. Bernard Co., America, Southampton, 3 cs.

Embossing Paper

Peerless Leaf Co., Vardulia, London, 15 cs.

Paperhangings

C. A. Haynes Co., Vardulia, London, 57 bls., 4 cs.
C. A. Haynes Co., American Producer, London, 33 bls., 1 cs.

Filter Paper

H. Reeve Angel & Co., Inc., Vardulia, London, 29 cs.
H. Reeve Angel & Co., Inc., American Producer, London, 16 cs.

Drawing Paper

H. Reeve Angel & Co., Inc., Vardulia, London, 2 cs.
H. Reeve Angel & Co., Inc., American Producer, London, 4 cs.

Tissue Paper

B. F. Drakenfeld & Co., Britannic, Liverpool, 20 cs. (pottery).
B. F. Drakenfeld & Co., Britannic, Liverpool, 61 cs. (gauze carbonizing).

Gummed Paper

B. F. Drakenfeld & Co., Britannic, Liverpool, 34 cs.

Photo Paper

Alco Photo Supply Corp., Queen Elizabeth, Southampton, 3 cs. (sensitized).

Baryta Coated Paper

D. W. Hickey, American Producer, London, 72 rolls.
Lep Transport Co., American Producer, London, 61 rolls (raw base).

Miscellaneous Paper

Stevens Nelson Paper Corp., Pioneer Mail, Yokohama, 5 cs.

Rags, Baggings, etc.

Chase National Bank, S. Bakke, Leghorn, 78 bls. old bagging.
(———), S. Bakke, Leghorn, 95 bls. rags.
Manufacturers Trust Co., S. Bakke, Naples, 155 bls. bagging.
A. W. Fenton Co., S. Bakke, Genoa, 97 bls. scrap bagging.
Castle & Overton, Inc., S. Bakke, Genoa, 108 bls. scrap bagging.
E. J. Keller Co., Inc., S. Bakke, Genoa, 385 bls. cotton rags.
A. Siegle Corp., American Traveler, Manchester, 118 bls. jute waste.
E. Butterworth & Co., Inc., American Traveler, Manchester, 119 bls. old bagging.
Castle & Overton, Inc., American Traveler, Manchester, 20 bls. prints, 21 bls. cotton gabardines.
(———), American Traveler, Manchester, 102 bls. new cotton cuttings.
National City Bank, American Traveler, Liverpool, 60 bls. old bagging.
(———), American Traveler, Glasgow, 134 bls. paperstock, 104 bls. bagging.
Trust Co. of North America, American Traveler, Glasgow, 105 bls. paperstock.
(———), Vardulia, London, 17 bls. new light cuttings.
(———), Vardulia, London, 71 bls. old strings, 53 bls. jute bagging.
Sadler Corp., Britannic, Liverpool, 82 bls. jute waste.
A. Siegle Corp., Britannic, Liverpool, 42 bls. jute waste.
Chemical Bank Trust Co., Britannic, Liverpool, 61 bls. tares.
Jay Bee Fibre Corp., Lista, Rouen, 97 bls. paperstock.
Irving Trust Co., Lista, Rouen, 52 bls. old bagging.
A. W. Fenton Co., Lista, Rouen, 53 bls. rags, 62 bls. cottons.
Acadia Co., American Producer, London, 31 bls. cotton rags.
E. Lang, American Producer, London, 96 bls. paperstock.
(———), Exemplar, Genoa, 188 bls. hemp rags.
Chase National Bank, Core du Nord, Marseilles, 61 bls. cotton rags.
(———), Stockholm, Gothenburg, 150 bls. rags.
Glant Co., Siboney, Havana, 75 bls. rags.
H. Reeve Angel & Co., Inc., Tidaholm, Ranma, 62 rolls paper waste.
Chemical Bank Trust Co., Rosa Thorden, Malmo, 191 bls. rags.
National City Bank, Rosa Thorden, Malmo, 56 bls. rags, 170 bls. bagging.
Bankers Trust Co., Rosa Thorden, Malmo, 502 bls. old bagging.
National City Bank, Selma Thorden, Gothenburg, 106 bls. paperstock.
Merchants National Bank, Selma Thorden, Gothenburg, 73 bls. rags.
D. Benedetto, Aagtedyk, Rotterdam, 87 bls. new rags, 43 bls. rags.
Atlantic By Products Co., Aagtedyk, Rotterdam, 430 bls. old rags.
Harris Goldman Co., Aagtedyk, Rotterdam, 99 bls. rags.
E. J. Keller Co., Inc., Express, Alexandria, 101 bls. old bagging, 96 bls. tares.
National City Bank, Express, Alexandria, 71 bls. bagging.
(———), Express, Casablanca, 169 bls. old jute rags, 6 bls. rags.
A. W. Fenton, Inc., Express, Casablanca, 374 bls. jute rags.
Irving Trust Co., Dorothy Stevenson, Genoa, 81 bls. old waste bagging.
H. Adlerstein, Dorothy Stevenson, Venice, 153 bls. jute rags.
Merchants National Bank of Mobile, Exeter, Leghorn, 61 bls. jute rags.
Atlas Waste Manufacturing Co., Brazil, Buenos Aires, 26 bls. rags.
J. Stein, Brazil, Buenos Aires, 64 bls. rags.

Gluestock

1st National Bank of Boston, Santa Clara, Barranquilla, 143 rolls.
J. Gorvers, Santa Clara, Barranquilla, 36 bls. gluestock.
Chase National Bank, Mormacstar, Buenos Aires, 44 bls.
Karr Ellis Co., Britannic, Liverpool, 175 bls.
(———), Siboney, Havana, 94 bls.

Casein

New York Trust Co., Brazil, Buenos Aires, 1000 bags (lactic).
American Cyanamid Co., Brazil, Buenos Aires, 1000 bags (lactic).
Tupman Thurlow Co., Brazil, Buenos Aires, 300 bags (lactic).
The Borden Co. Chemical Division, Brazil, Buenos Aires, 400 bags (lactic).
East Asiatic Co., Brazil, Buenos Aires, 500 bags.
American British Chemical Supplies, Brazil, Buenos Aires, 500 bags.
E. Lang, Brazil, Buenos Aires, 2000 bags (lactic).
J. H. Schroeder Banking Corp., Brazil, Buenos Aires, 100 bags.
(———), Brazil, Buenos Aires, 1000 bags (lactic).

Woodpulp

Price & Pierce, Ltd., Markland, Liverpool, N.S., 938 bls. sulphite pulp.
Cellulose Sales Co., Tidaholm, Gothenburg, 1800 bls. dry sulphite pulp.
Pagel Horton & Co., Inc., Tidaholm, Gefle, 250 bls. dry sulphite pulp.
(———), Aagtedyk, Hamburg, 2575 bls. perforated pulp.
Cellulose Sales Co., Stockholm, Gothenburg, 1535 bls. sulphite pulp.

WILLIAMS PRECISION FREENESS TESTER

The Most Accurate Freeness Tester Ever Built

Operates on the Only Correct Principle of Freeness Testing. Automatic Timing with Electric Stop Clock which Measures Drainage Rate through a Wire, same as on Paper Machine.

For 25 years we have developed and manufactured Pulp and Paper Testing Equipment

Pulp Testing Ovens
Sheet Moulds
Laboratory Presses
Sheet Dryers
Wood Chip Classifiers
Pebble Mills
A.S.T.M. Penetration Testers
Electric Centrifuges
Paper Moisture Testers
Smoothness Testers
Laminating and Plastic Moulding Presses

WILLIAMS APPARATUS CO., Inc.

19 Park Place **Watertown, N. Y.**

China Clay

English China Clays Sales Co., Montreal City, Avonmouth, 420 bags.

J. W. Higman, Montreal City, Avonmouth, 49 tons.

IMPORTS AT NEWARK

Week Ending Dec. 23

Pagel Horton & Co., Inc., Rosa Thorden, Karskar, 3556 bls. woodpulp.

Mead Sales Co., Inc., Samtruth, Port Alberini, B.C., 2978 bls. unbleached sulphate pulp.

IMPORTS AT ALBANY

Week Ending Dec. 23

Pagel Horton & Co., Inc., Selma Thorden, Karskar, 4012 bls. woodpulp.

Pagel Horton & Co., Inc., Selma Thorden, Ornskoldsvik, 10576 bls. sulphate pulp, 762 bls. sulphite pulp.

Pagel Horton & Co., Inc., Selma Thorden, Hornefors, 2130 bls. dry sulphite pulp.

IMPORTS AT BROWNSVILLE, TEXAS

Week Ending Dec. 23

American Cotton Co., Arkeldyk, Rotterdam, 750 pieces wallboard.

IMPORTS AT PHILADELPHIA

Week Ending Dec. 23

Castle & Overton, Inc., Tidaholm, Gothenburg, 441 bls. sulphite pulp.

Stora Kopparberg Co., Tidaholm, Skutskar, 930 bls. dry woodpulp.

Pagel Horton & Co., Inc., Tidaholm, Gefle, 3330 bls. dry sulphite pulp.

Jay Madden Corp., Tidaholm, Rauma, 90 rolls sulphite wrapping paper, 705 rolls wrapping paper.

Pulp Sales Co., Tidaholm, Rauma, 234 bls. paper waste, 754 bls. dry mechanically ground woodpulp.

Elof Hansson, Inc., Tidaholm, Rauma, 239 crates insulating board.

Colonial Lumber Co., Tidaholm, Rauma, 391 bls. insulating board.

Chemical Bank Trust Co., Rosa Thorden, Malmo, 42 bls. rags.

Gottesman & Co., Inc., Rosa Thorden, Sundevall, 8400 bls. unbleached sulphite pulp.

Pagel Horton & Co., Inc., Rosa Thorden, Karskar, 3150 bls. woodpulp.

J. H. Schroeder Banking Corp., Selma Thorden, Hernosand, 390 bls. wallboard.

Bulkley Dunton Co., Aagtedyk, Rotterdam, 540 bls. woodpulp.

State Street Trust Co., S. Bakke, Leghorn, 136 bls. old cotton rags.

Philadelphia National Bank, S. Bakke, Leghorn, 105 bls. scrap bagging.

S. S. Alcorn, Montreal City, Newport Mon, 1 cs. 9 bls. wrapping paper.

English China Clays Sales Corp., Montreal City, Avonmouth, 196 tons, 2035 bags china clay.

Moore & Munger, Montreal City, Avonmouth, 1344 bags china clay.

G. Wallworth, Lista, Rouen, 9 bls. rags.

L. Gottlieb, Cape Nome, Rotterdam, 58 bls. fustians.

IMPORTS AT BALTIMORE

Week Ending Dec. 23

Pagel Horton & Co., Inc., Selma Thorden, Karskar, 508 bls. woodpulp.

Pagel Horton & Co., Inc., Selma Thorden, Ornskoldsvik, 1085 bls. sulphate pulp.

Pagel Horton & Co., Inc., Selma Thorden, Hornefors, 1830 bls. dry sulphite pulp.

Chase National Bank, Selma Thorden, Hernosand, 34 bls. wallboard.

S. Shapiro & Son, Lista, Rouen, 134 bls. rags.

S. Shapiro & Son, Cape Nome, Rotterdam, 54 bls. rags.

S. Shapiro & Son, American Producer, London, 110 bls. cotton rags.

Gottesman & Co., Tidaholm, Gothenburg, 254 bls. dry sulphate pulp.

Bulkley Dunton Pulp Co., Tidaholm, Gefle, 2794 bls. dry sulphite pulp.

Pulp Sales Co., Tidaholm, Rauma, 1524 bls. unbleached sulphate pulp, 432 bls. dry mechanically ground woodpulp.

Jay Madden Corp., Tidaholm, Rauma, 143 rolls boxboard.

State Street Trust Co., S. Bakke, Naples, 240 bls. cotton rags.

IMPORTS AT BOSTON

Week Ending Dec. 23

Chase National Bank, Aagtedyk, Hamburg, 11 cs. colored paper.

Swift & Sons, Aagtedyk, Antwerp, 10 cs. wrapping paper.

Transatlantic Animal By Products, Pioneer Mail, Hong Kong, 100 bls. gluestock.

(———), African Enterprise, Durban, 69 bags lactic casein.

IMPORTS AT NORFOLK

Week Ending Dec. 23

Hipage Co., American Traveler, Manchester, 40 bls. old bagging.

(———), American Traveler, Glasgow, 92 bls. paperstock.

F. P. Gaskell Co., American Traveler, Glasgow, 63 cs. coated paper.

A. De Vries Trading Corp., Aagtedyk, Rotterdam, 72 bls. scrap bagging.

D. Benedetto Express, Bombay, 100 bls. old jute rag.

E. J. Keller Co., Inc., Express, Bombay, 40 bls. bagging.

1st National Bank, S. Bakke, Genoa, 43 bls. bagging.

A. de Vries Trading Corp., S. Bakke, Genoa, 97 bls. scrap bagging.

R. J. Reynolds Tobacco Co., Lista, Havre, 242 cs. cigarette paper.

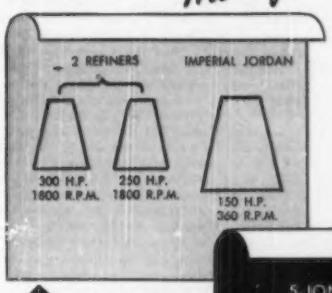
D. Benedetto, Lista, Rouen, 136 bls. rags.

IMPORTS AT NEWPORT NEWS

Week Ending Dec. 23

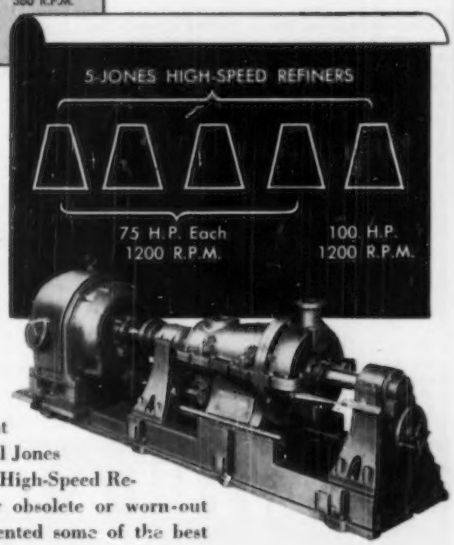
Pagel Horton & Co., Inc., Rosa Thorden, Hornefors, 2462 bls. dry sulphite pulp.

Better Control More flexibility better preparation



OLD INSTALLATION

and a clean SAVING OF OVER 300 OPERATING HORSEPOWER!



NEW INSTALLATION

The refining equipment replaced (in this actual Jones installation) by Jones High-Speed Refiners was not old or obsolete or worn-out equipment. It represented some of the best current competitive thinking.

Yet Jones High-Speed Refiners actually produced improved stock — at a saving of over 300 operating horsepower. They save on maintenance cost, too.

For more information, write for Bulletin EDJ-1011-A.

E.D. Jones

E. D. Jones & Sons Company, Pittsfield, Mass.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

Patent Abstracts

● *In addition to abstracts on the technology of pulp, paper and related industries, miscellaneous abstracts which may provide useful information are included.*

U.S. 2,530,986 — Plaster of Paris Containing Paper and Method of Making. Edmund Quincy Moses, Scarborough, N. Y. Filed August 12, 1944 — Issued November 21, 1950.

The process of making a formed paper article which consists in beating up paper pulp and finely divided gypsum, forming the pulp containing the gypsum into a sheet, drying the sheet, heating the sheet to convert the gypsum into plaster of Paris, forming the desired article from said sheet, wetting said article, and permitting the same to set in the desired form.

A cohesive exible, substantially homegeneous, dry paper web containing paper pulp material and unhydrated plaster of Paris in sufficient quantity to render the paper settable after moistening.

U.S. 2,531,213 — Paper Folding Machine and Method. Leslie T. Hand, Brooklyn, N. Y., assignor to Morsegraph, Inc., New York, N. Y. Filed March 16, 1946 — Issued November 21, 1950.

The method of producing a stack of folded continuous and uninterrupted paper from a web of paper which comprises supporting a substantially vertical run of web above a generally horizontal supporting surface, providing slack in said vertical run, removing slack by forming a transverse fold in one direction, gripping the margins of the fold, forming a second transverse fold in a direction opposite the first fold at a spaced interval from the first fold, gripping the margins of said second fold, releasing the grip on said first formed fold at one side of said vertical run in close proximity to said supporting surface while the second fold remains gripped, thereafter releasing the grip on said second formed fold at the opposite side of the vertical run and in close proximity to said supporting surface, and continuously repeating said folding gripping and releasing operations in said sequence.

U.S. 2,531,630 — Cream Remover. John Paul Jones, Omaha, Nebr., assignor to Dairy Specialties, Inc. Filed June 18, 1945 — Issued November 28, 1950.

The combination with a paper milk bottle having a wall with a pouring aperture and a hinged flap and an inner wall strip attached to the inside surface of the wall with an opening and a hinged tab adhering thereto and opening therewith, of a cream draw-off attachment comprising a paper-like sheet secured over the inner wall strip opening and having a lower discharge opening at the lower cream level and an air inlet opening above the upper cream level.

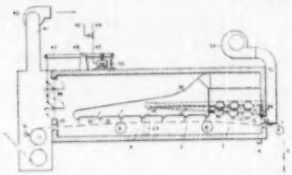
U.S. 2,531,792—Shipping Container. Roscoe B. Smith, Wilmington, Del., assignor to Hercules Powder Company, Wilmington, Del. Filed December 10, 1946 — Issued November 28, 1950.

An end seal for a tubular fiber container which comprises an inwardly and interiorly extending fluted end wall formed by inwardly crimping the end of the container body, said fluted end wall substantially completely closing the end of the container and defining a shallow concavity extending interiorly from the folded edge of the container body, said folded edge forming a rounded hollow cavity wherein the portion of the body folded inwardly is spaced from the unfolded portion thereof; an exterior fiber disc disposed within the concavity interiorly of the folded edge and in juxtaposition to the outer surface of the fluted end wall; an interior fiber disc disposed in juxtaposition to the inner surface of the fluted end wall, said interior disc having a diameter substantially equal to the inner diameter of the container; and a plurality of metallic stitching staples passing through and securing together the exterior disc, the fluted end wall and the interior disc, said staples being disposed near the periphery of the exterior disc and forming an annular indentation therein.

U.S. 2,531,931—Composite Material. William C. Arkell, Englewood, N. J., assignor to Arkell Safety Bag Company, New York, N. Y. Filed June 1, 1946 — Issued November 28, 1950.

Composite material of the class described comprising a web of paper having transversely extending crinkles to provide for stretchability longitudinally of the web and having longitudinally extending corrugations to provide for stretchability transversely of the web, the corrugations being of flattened dove-tail form, and a web of non-felted carded cotton fibers adhesively secured to the crests of the flattened corrugations at each side of the paper web, the cotton fibers extending generally longitudinally of the web.

U.S. 2,532,032—Apparatus for Drying Webs. Bernard Offen, Chicago, Ill. Filed January 28, 1947 — Issued November 28, 1950.



In a method of drying a web, the steps which comprise directing radiant heat over the surface of a web in a first drying stage, directing air heated to a predetermined temperature over a surface of the web in a second drying stage, then, when travel of the web through the stages is interrupted, substantially instantaneously discontinuing the supply of air heated to such temperature over the web, moving the radiant heating means away from the web, and directing relatively cold air over the surface of the web in the first drying stage thereby permitting substantially instantaneous stopping of the web in the chamber without injury to the web by radiant heat.

U.S. 2,532,101 — Method for Separating Rosin Acids from Mixed Materials. Nicholas L. Kalman, deceased, late of Rutherford, N. J., by Anna Kalman, executrix, Essex County, N. J., assignor, by mesne assignments, to Pierce Laboratory, Inc., New York, N. Y. Filed December 1, 1947 — Issued November 28, 1950.

The method of separating rosin acids from mixed materials containing rosin acids, which comprises placing such materials in solution in an organic solvent in which the rosin acids and materials mixed therewith are soluble but in which cyclohexylamine salts of the rosin acids are substantially insoluble, treating the solution with cyclohexylamine, and effecting separation of the resultant rosin acid cyclohexylamine salt at a temperature at which said salt is a solid.

U.S. 2,532,183—Treatment of Cellulosic Textile Material to Increase Its Water Absorbency. David M. Musser, East Orange, N. J., assignor to Pacific Mills, Boston, Mass. Filed August 18, 1948 — Issued November 28, 1950.

A method for enhancing the rate of water absorbency of cellulose textile material without weakening the material, which comprises immersing the cellulose textile material in an alkaline

PARAFFIN & MICROCRYSTALLINE WAXES

CARLOADS — TANK CARS — TRUCKS

NATIONAL WAX COMPANY

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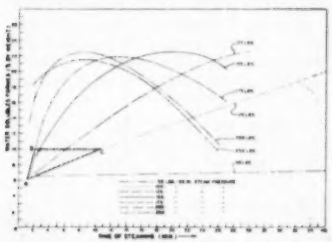
aqueous solution containing sufficient alkali metal hydroxide to bring the pH of the solution into the range 11 to 13, and an amount between 0.1% and 5% by weight of the textile material of an alkyl phosphate in which the alkyl group contains more than 3 and less than 6 carbon atoms, and maintaining the textile material in said solution under from 5 to 25 pounds pressure and at a temperature above the boiling point of water for from 2 to 14 hours.

Can. 469,629 — Paper Rolls Winding Machines. Hendrik Hendrik Drent, Eerbeek, Holland. Filed May 16, 1946 — Issued November 28, 1950.

Machine for manufacturing rolls of paper or like material of definite length more particularly a so-called kitchen paper roll machine, provided with a feeding mechanism with a measuring roller, which is coupled with a control mechanism, which actuates a cutting mechanism or severing mechanism after the desired length has passed, which cutting mechanism operates on the moving web, and a winding mechanism, which winds up the predetermined amount of material and which is automatically opened for the ejection of a finished roll and is then closed again, characterized in that the control mechanism coupled with the measuring roller co-operates with an actuating mechanism of a change-speed mechanism, which lies in the driving arrangement of the measuring roller and with which the speed of the feeding mechanism can be changed from the normal speed to a very reduced speed and vice versa.

Can. 469,636—Cellulosic Fibres and Their Production. Clark C. Heritage, Cloquet, Minnesota, U.S.A. Filed May 19, 1947 — Issued November 28, 1950.

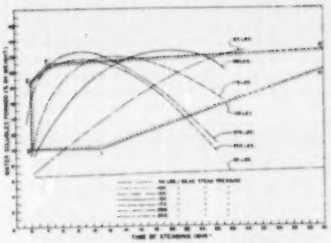


A process for the production of cellulosic fibre of improved properties which comprises mechanically defibrating wood and subjecting the wood in fibre form to the action of steam at pressures of about 100 pounds per square inch to about 175 pounds per square inch and for durations of from about eleven minutes to about one minute, the duration of steaming being inversely co-ordinated to the pressures employed.

A process for the production of cellulosic fibre of improved properties which comprises mechanically defibrating wood and subjecting the wood in fibre form to the action of steam at pressures and for durations delimited by the ranges of from one to two minutes at 175 pounds per square inch, from one to three minutes at 150 pounds per square inch, and one six minutes at 125 pounds per square inch, and one to eleven minutes at 100 pounds per square inch.

Can. 469,637 — Processes of Making Chemical Products from Wood. Clark C. Heritage, Cloquet, Minnesota, U.S.A. Filed May 19, 1947 — Issued November 28, 1950.

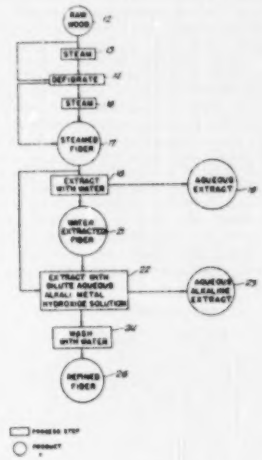
A process for the production of water soluble derivatives of wood with the simultaneous production of a useful cellulosic residue, which comprises reducing wood by mechanical means substantially completely to the form of ultimate fibres, and subjecting said fibres to the action of steam at pressures of between about 100 pounds per square inch and about 250 pounds per square inch and for durations of from about forty-five minutes to one-half minute, the duration of steaming being inversely co-ordinated to the pressures employed.



A process for the production of water soluble derivatives of wood with the simultaneous production of a useful cellulosic residue, which comprises reducing wood by mechanical means substantially completely to the form of ultimate fibres, subjecting said fibres to the action of steam at pressures of between about 100 pounds per square inch and about 250 pounds per square inch and for duration of from about forty-five minutes to one-half minute, the duration of steaming being inversely co-ordinated to the pressures employed, forming a mixture comprising between about 4 and about 150 parts by weight of the steamed fibre and about 100 parts by weight water, heating said mixture to a temperature of between about 50°C. and about 100°C. for a time period of between about one-quarter hour and about one hour, and separating the resulting aqueous solution of water soluble substances from the residual fibre.

Can. 469,638 — Cellulose Fibres and Processes for Their Production. Clark C. Heritage, Cloquet, Minnesota, U.S.A. Filed May 19, 1947 — Issued November 28, 1950.

A process for the production of an improved cellulosic fibre which comprises mechanically reducing wood substantially completely to the form of ultimate fibres, subjecting said fibres to the action of steam within the range of times and pressures delimietd by the values of from about 100 pounds per square inch to about 175 pounds per square inch, and from about eleven minutes



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to about one minute, the duration of treatment being inversely co-ordinated with the steam pressure employed, and subjecting the resulting steamed Fibre to the action of a dilute aqueous solution of an alkali metal hydroxide in concentration equivalent to that of a 0.1 per cent to a 3.75 per cent by weight solution of sodium hydroxide said solution being used in an amount sufficient to furnish the equivalent of from about 1 part to about 25 parts by weight sodium hydroxide per 100 parts by weight fibre.

A process for the production of an improved cellulosic fibre which comprises mechanically reducing wood substantially completely to the form of ultimate fibres, subjecting said fibres to the action of steam at pressures of from about 100 pounds per square inch to about 175 pounds per square inch and for times of from about eleven minutes to about one minute, the duration of treatment being inversely co-ordinated with the steam pressure employed, washing the steamed fibre with water for removal of its content of water soluble materials, and then subjecting the washed fibre to the action of an aqueous solution of an alkali metal hydroxide having a concentration equivalent to that of a sodium hydroxide solution containing from about 0.1 per cent to about 3.75 per cent by weight of sodium hydroxide, said solution being used in an amount sufficient to furnish a weight of alkali metal hydroxide equivalent to from about 1 part to about 25 parts by weight sodium hydroxide per 100 parts by weight fibre.

Can. 469,806 — Methods of Surface Coating Tissue Paper with Thermoplastic Resins. Irving Gurwick, New York, New York, U.S.A. Filed April 10, 1944 — Issued December 5, 1950.

If your problem is
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Automatic Backwash Rapid
SAND FILTERS
for Paper Mill Water Supply
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Best Sand Filters made
For removal of non-settling or slow-settling suspended matter. Self-cleaning sand bed. No shutdown necessary for backwashing. Bulletin 46-14.
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The method of surface coating a tissue paper with a thermo-responsive resin, which consists in first coating a thin film of a solution of the resin on a non-adherent carrier, in treating the carrier applied film to effect partial evaporation of the solvent leaving the film partially dried and in a still tacky condition, in then engaging solely by interfacial contact the thus treated film on the carrier with the tissue paper, in then separating the carrier and the tissue paper, the resin film thereby transferring from the carrier and becoming adheringly attached as a thin superficial film to the contacted surface of the tissue paper, and in then heating the resin coated tissue paper and breaking down the continuity of the resin film to form an open mesh which increases the wet strength of the tissue paper without sealing it against filtration for infusion.

A paper infusion bag comprising tissue paper walls having their edges heat sealed with a thermo-responsive resin and having their porous faces reinforced by a porous formation of a thermo-responsive resin consisting of a thin superficial film of a thermo-responsive resin derived from a solution of the resin applied to the tissue paper and broken down by heat into a porous of perforate state at the pores of the tissue paper walls.

BROWN APPOINTS WHITAKER

Whitaker Paper Co., Atlanta, Ga., has been appointed a distributor of Escort Index Bristol, made by L. L. Brown Paper Co., Adams, Mass. This merchant is also a distributor of three other L. L. Brown papers: L. L. Brown's Linen Ledger, Greylock Ledger and Escort Ledger.

NEW LITERATURE

Lockwood Trade Journal Co., Inc. Book, 200 pp. illustrated, price $5. "University of Maine Lectures on Pulp and Paper Manufacture." Edited by Professor Lyle C. Jenness and Professor John Lewis.

Process Industries Engineers, Inc. Bulletin 101, "Mixing and Agitating Equipment." Sales copy with Technical Data Chart on Viscosity at Agitation Temperature–Centipoise.

Supt. of Documents, Govt. Printing Office. Pamphlet, "The Effects of Atomic Weapons." Provides the unclassified basic scientific and technical information of the phenomena and effects accompanying an atomic explosion.

Hendrick Mfg. Co. Bulletin, "Hendrick Wedge-Slot Screen." Applications and general specifications.

Gruendler Crusher & Pulverizer Co. Bulletin, "Equipment for the Pulp and Paper and Allied Industries." Bulletin No. 57, "Turbo Pulp Refiner."

The B. F. Goodrich Co. Catalog 26 pp., describes and illustrates in detail all major parts used in construction of a line of conveyor and elevator belts.

National Planning Assn. Special Report No. 28, price 15c, "Renegotiation of Defense Contracts." Based on the principle that undue profits arising out of defense contracts with the government should be prevented by effective renegotiation procedures.

Forest Products Research Society. Book, cloth-bound, over 500 pp. FPRS Annual Proceedings. Contains 44 technical papers and discussion presented at fourth annual meeting; reference work covering the entire field of forest products from logging through utilization.

A. Milne & Co. Bulletin AM-100, "Eliminate Machining Operations with Milne's Pre-Shaped Steels — Steel Sections Cold-Drawn to Fit Your Requirements."

Ledeen Mfg. Co. Bulletin 510, "Ledeen Valves." Introduces line of valves for actuating air or hydraulic cylinders.

Omega Machine Co. Bulletin 35-G5, "Midget Belt Gravimetric Feeder." Features "Model 50-8, A small weighing feeder for dry materials."

Dodge Mfg. Co. Bulletin A-601, "Dodge Slide-Set Vise."

The Thew Shovel Co. Bulletin, "Application of Lorain shovels and cranes to the Logging, Pulpwood and Lumber industries." Consists entirely of job stories and photographs.

Seaboard Air Line Railroad Co. Forestry Bulletin, Number 24, "Forest Fires and the Bible."

The Oilgear Co. Bulletin 10051-A. Illustrates and describes a complete line of fluid power pumps, motors, transmissions, cylinders and valves.

Builders-Providence, Inc. Bulletin 840-G27, "Chlorinizer Volumetric Model HCVS." Lists many features of Chlorinizer; shows cut-away drawing of functioning parts.

Ansul Chemical Co. Brochure, "Dry Chemical Piped Systems — Your Best Fire Protection, For Total Flooding . . . For Local Application."

W. A. Kates Co. Bulletin 502, "Kates Direct Acting Regulator, The Simple Way to Regulate Flow Volume." Illustrates typical performance; highlights "How a Single Independent Instrument Provides Positive, Dependable Flow Regulation."

Arthur D. Little, Inc. Bulletin, "Advanced Equipment for Science and Industry."

OBITUARIES

Willard S. Beck, 35, Northwest manager of the Scott Paper Co., was killed December 19 in an automobile accident in Portland, Ore. Surviving are his widow, Mrs. Joan Woodhouse Beck; a daughter, Carol; two sons, George and Bryan; and a sister, Mrs. Marion Hazeltine.

Carl E. Apelgren, technical director of the Kraft Paper Division, St. Regis Paper Co., died December 26 at Oswego, New York. Mr. Apelgren had been with St. Regis Paper Co. for many years and was active in Empire State Section of TAPPI.

JAMES H. ALLEN

J. H. ALLEN DIES

PENSACOLA, Fla.—Following a cerebral hemorrhage, James H. Allen, 70, vice-chairman of the St. Regis Paper Co., passed away at his home here December 18.

Mr. Allen, an outstanding industrial and civic leader, was one of the principals in the organization of the multi-million-dollar paper and bag manufacturing plant at Cantonment, Fla.

The Florida Pulp & Paper Co., the State's first paper mill, was organized by Mr. Allen in 1941.

In 1948, this company joined with the Alabama Pulp & Paper Mill in combining with St. Regis Paper Co. to build the Cantonment project.

About the same time the firm added the modern multi-wall paper bag factory.

D. A. Evans, 65, director and former vice-president of the Powell River Co., Powell River, B. C., died there recently.

Mr. Evans became resident manager of the Powell River Co. in 1936, and in 1947 became vice-president. He went on sick leave in January, 1948, and retired from active service with the company early in December this year. He remained a director.

Mr. Evans was an honorary life member of the technical section of the Canadian Pulp and Paper Assn. and a life member of the Engineering Institute of Canada.

Surviving are his widow; a son, Thomas; and a daughter, Marjorie.

J. W. Gulledge, 37, superintendent of the Crossett (Ark.) paper mill, was found dead in his car near Magnolia on December 20.

Deputy Sheriff Hurley Quinn said Gulledge's car apparently had struck a bridge culvert and had gone into a nearby creek.

Mr. Gulledge was on his way to Springhill, La., to join his wife and children who were visiting relatives there.

He is survived by his widow; a son, Ronnie, 11; and a daughter, Judy Ann, 7.

Robert G. Prosser, 34, son of the founder of the Bermingham and Prosser Paper Co., and himself associated with the firm, died in Deerfield, Ill., on December 14 of a heart attack.

WILLIAM B. BELL

William Brown Bell, 81, president of American Cyanamid Co., died of a heart attack on December 20, at Marrakeech, French Morocco. He was on a business trip surveying the company's interests abroad at the time of his death.

Mr. Bell became president of American Cyanamid Co. in 1922 and was serving as president of that organization at the time of his death.

Mr. Bell's integration of the numerous companies merged to form the present American Cyanamid Co. was a major achievement in industrial management. The growth of this company illustrates many of the principles for which Mr. Bell stood throughout his life.

Opportunity, a free enterprise system and initiative led him from a comparatively poor boy to the head of a great industrial enterprise. Vital to the success of the enlarged company has been the development of a strong and capable research organization. Mr. Bell was keenly interested in fostering this phase of the company and devoted much of his personal attention to it.

Mr. Bell was awarded the Chemical Industry's Medal in 1934 for distinguished economic service to the chemical industry. He served as chairman of the board and president of the Manufacturing Chemists Association and the Chemical Alliance. In this latter organization, he directed its work during the days of NRA and guided the chemical industry through many trying phases.

For many years, Mr. Bell had been a member of the board of directors of the National Association of Manufacturers. He was actively interested in its post-war planning work and served as a regional vice-president and as a member of the National Industrial Information Committee. At the time of

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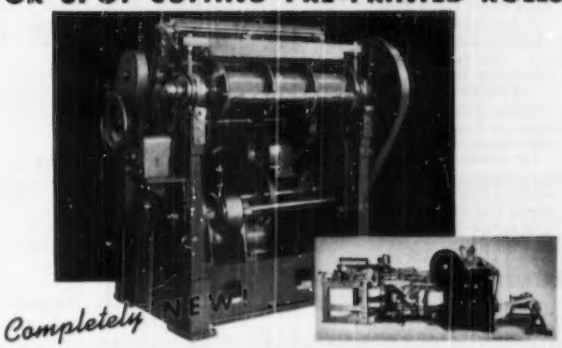

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his death, he was an honorary vice-president. He was largely responsible for instituting the practice of publishing an Annual Platform of the Association.

During his early days, Mr. Bell was associated with James B. Duke. From its foundation to the time of his death, Mr. Bell was a member of the Duke Endowment. In addition, he was a director and chairman of the board of Jefferson Chemical Co., Inc., director and vice-president of Southern Alkali Corp., and director of Southern Minerals Corp.

In 1949, Mr. Bell was awarded the honorary degree of Doctor of Science by the Philadelphia College of Pharmacy and Science. Also in 1949, he received the Chemical Industry Medal from the Society of Chemical Industry for outstanding contributions to advancements in this field.

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AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16*
1950	106.8	102.4	104.1	106.8r	106.9
	Nov. 19	**Nov. 26**	**Dec. 3**	**Dec. 10**	**Dec. 17**
1949	*93.6*	*94.5*	*99.5*	*99.9*	*98.7*

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1949	*94.6*	*92.8*	*89.1*	*85.1*	*82.7*	*78.6*	*72.8*	*87.6*	*89.7*	*96.0*	*98.2*	*89.8*	*88.0*
1950	97.6	100.8	101.9	100.5	100.8‡	103.2‡	90.8‡	105.8‡	101.7‡	106.7‡	105.8‡		

* Weekly capacity base increased by 420 tons.
r Revised.
‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1943	1944	1945	1946	1947	1948	1949	1950
Year to Date	88.1	88.6	89.9	101.6	104.9	97.1	88.9	102.0
Year Average	87.8	88.1	89.4	100.1	104.3	96.2	88.0	

PAPERBOARD OPERATING RATIOS†

	Nov. 18	Nov. 25	Dec. 2	Dec. 9	Dec. 16
1950	103	100	101	106	105
	Nov. 19	**Nov. 26**	**Dec. 3**	**Dec. 10**	**Dec. 17**
1949	*91*	*90*	*93*	*96*	*92*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1949	*88*	*85*	*79*	*79*	*78*	*75*	*64*	*86*	*87*	*94*	*93*	*85*	*83*
1950	88	92	91	92	91	94	82	100	96	102	101		

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Extra! Extra! Extra! Change in Ratio Report

After January 1, 1951 a radical change in the method of calculating the Weekly Production Ratio Report will be made effective as outlined in the following statement:

Ever since the Production Ratio Report was started in 1934 it has been calculated weekly with reference to a capacity base of six times the daily capacity. During this sixteen year period an increasing number of mills have made it a normal practice to operate seven days a week. This has resulted, when figured on a capacity base of six days a week, in a growing distortion of the Production Ratio as reported by the American Paper and Pulp Assn.

Commencing with January 1, 1951, the capacity base will be calculated on a seven day operating week for mills that normally operate on a seven day basis, and on a six day operating week for all other reporting mills. The effect of this action will be to reduce the ratio as reported by the association after January 1, 1951 by between 5% and 6%.

The actual difference for some recent weeks are:

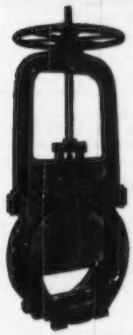
	Production Ratio		
Week Ending	*As Now (All 6 day Basis)*	*As Revised (Part 6, part 7 day Basis)*	%
September 23, 1950	106.6	100.8	5.8
September 30, 1950	106.2	100.6	5.6

Please note the date of the change will be the Production Ratio Report for the first week in January 1951, the week ending January 6, 1951.

Our regular news release on this subject will give both the current week and the corresponding week of the previous year on the same 6 and 7 day basis, so these ratios will be comparable.

It is hoped that this change will be given wide publicity in the interest of intelligent interpretation of this pulse of the paper industry.

The changes in the A.P.P.A. Production Ratio will, of course, not affect the Production Ratio for paperboard as issued by the National Paperboard Assn.



RECORD PAPER & PULP STOCK VALVES "BONNETLESS SELF CLEARING - - - "RESIDUE POCKETLESS TYPE"

METALS — I.B.B.M., all iron, bronze or stainless steels, body parts plain or rubber lined.

The photo of 24" Fig. 241 I. B. B. M. valve while illustrating the gate bottom wedge system for forced gate seating and "GUILLOTINE" edge for shearing fibre at seat also shows the packing box and yoke as separate units. Both adjustable.

- The "FAST THREADED" screw stem and ball bearing speeds valve operation.
- The packing box is extra deep, is adjustable and provided with specialized lubricated packings and special type gland and compression bolts.
- The yoke mountings are such that yokes for various methods of gate operation are interchangeable.
- Replaceable gate edge shoes are used in valves 10" and larger. These shoes are of special value when valves are installed stem and pipe horizontal.

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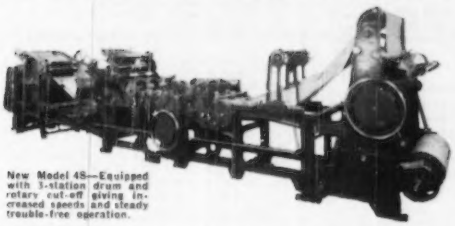

New Model 4S—Equipped with 3-station drum and rotary cut-off giving increased speeds and steady trouble-free operation.

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Makes a wide range of bags from 5 lb. sack to huge super-market carrier bags. Has adjustable former to vary sack widths, trade-mark imprinting unit, 2 hole punch and scoring device for string handles, roll lifting mechanism for easier loading.

Can be directly connected to a Potdevin multi-color aniline press. Compensator and electric eye can be added for pre-printed papers as well as liner for two-wall (duplex) bags.

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Cowles NU-NAP contains a new combination of products and a brand new idea in detergent action. NU-NAP does an outstanding washing job on paper machine felts — both on and off the machine. NU-NAP will give extra life to your felts—it leaves them unusually clean—fluffy and absorbent.

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Bleach chemist, also chemists for de-inking and chemists for paper coating plants; mill engineer to act as consulting engineer in all phases of paper and pulp mill work; converting engineer thoroughly familiar with converting operations; general foreman converting dept.; salesman with thorough experience in southern kraft pulping operations to sell equipment, previous selling experience preferred but not essential.

Mechanical engineers, draftsmen, designers, master mechanics and plant engineers for mills also firms building paper-pulp mill machinery; Cylinder and Fourdrinier machine foremen; beater engineers; machine tenders and back tenders; board machine tender (foreign) $500 month, room, board and transportation paid.

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WANTED—Paper Mill Superintendent for cylinder tissue mill making colored Twisting Tissue. Must be a practical man with knowledge of color matching and general mill maintenance. New York State location. Address Box 50-612 care Paper Trade Journal. J-5

MACHINE TENDER—Qualified on high grade folding boxboards. High pay rate—pleasant working conditions. Address Box 50-588 care Paper Trade Journal. D-28

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WANTED

Night Superintendent to take full charge of two-machine Mill making Sulphite and Rag Content Papers. Must be experienced, aggressive, honest, and dependable. In application, state complete details and references. Excellent opportunity for an ambitious man. Write Box No. 50-625 care Paper Trade Journal J-19

WORKING SUPERINTENDENT for small, fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 50-378 care Paper Trade Journal. TF

TOUR BOSS wanted for Board Mill in East. Must have experience on folding grades. Address Box 50-473 care Paper Trade Journal. TF

WANTED — SALES ENGINEER — Experienced in Pulp and Paper Mills, for sales and service work. Excellent opportunity with old established machinery manufacturer. In reply, give resume of education, experience and current salary. Address Box 50-513 care Paper Trade Journal. TF

ENGINEERING DRAFTSMEN (2), under forty, some experience in pulp and paper industry, for large mill in South. Submit resume to Box 50-623 care Paper Trade Journal. J-12

CHEMICAL ENGINEER to fill position of Assistant Quality Control Supervisor in large fiber insulation board manufacturing plant, located in South. All replies confidential. Our personnel know of this ad. Address Box 50-621 care Paper Trade Journal. J-19

WANTED—MASTER MECHANIC for one machine mill making Folding Grades. Good saalry and good working conditions. Contact R. E. STEARNS, Empire Box Corp., of Stroudsburg, P. O. Box 54, Stroudsburg, Pennsylvania. J-12

BACK TENDER AND BEATER ENGINEERS—Must be thoroughly experienced on folding and set-up boards. Steady work, excellent pay. Miami Paper Board Mills, Inc., P. O. Box 97, Int'l Airport, Miami, 48, Fla. D-28

SITUATIONS WANTED

FELT SUPERINTENDENT—27 years experience in operating and setting up Felt Mills. Know the latest and less costly system to use. Will be glad to meet you and talk it over. Address Box 50-619 care Paper Trade Journal. J-5

SITUATIONS WANTED

SKILLED PAPER MAKERS AVAILABLE

Tour Bosses, Machine Tenders, Backtenders, Beatermen, Converting Machine Operators, Laboratory Technicians—all thoroughly experienced in making full range of colors and qualities of fine grades including rag. Available due to company discontinuing manufacture of paper.

Address inquiries to
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Washington 7, D. C.
J-5

FOR SALE

FOR SALE

32" Cameron model 24-3A Slitter.
48" Kidder model CH shear cut Slitter.
32" Hobbs Box Slitter.
44" Beck Sheeter with 10-roll back-stand and layboy.
36" Hamblet Sheeter.
58" Finley Sheeter.
100" Horne single-knife Sheeter.
68" Oswego mill type Power Cutter.
38" Acme & 40" C. & P. Automatic Power Paper Cutters.
36 x 48 Kidder one-color Rotary.
3-color Cottrell 22½ Bag Press.
Model B Cleveland Folder with continuous feeder. Extension Delivery for 4-0 or 5-0 Miehle.
No. 3 Smyth Book Sewer.
16 and 24-page Newspaper Presses.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 18
(Plant at Stamford, Conn.)
TF

FOR SALE

116" Model 29 Hamblet Sheeter, Heavy Type Duplex, with 12 roll back stand. Also Erie overlapping delivery duplex, Automatic 4-pile lay-boy. Complete accessories and spare parts for both. All in perfect condition and available for immediate delivery. Box 50-605, c/o Paper Trade Journal. D-28

FOR SALE

1—10 ft. x 30 ft. Barking Drum—Fibre Making Processes, Inc. Recently rebuilt and as good as new—complete, including drive and 100 h.p. motor.

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D-28

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250 Frelinghuysen Ave., Newark, N. J.
Tel. BIgelow 3-3720 D-28

FOR SALE—64" Seybold Full Automatic Power Paper Cutter; 36" Beck and 48" Kidder Sheeter with Layboy; 26" x 38" Thomson Platen Die Cutter; 36" Waldron Rotary Embosser. Write for Bulletin "K" listing over 170 Boxboard Container and Paper Converting Machines—For immediate delivery. GREGORY INC., 203 No. Wabash Ave., Chicago, 1, Illinois. TF

FOR SALE—Dyestuffs, Baste—for Paper Coloring—approximately 3000 lbs., assorted. List and prices on request to R. T. MOORHOUSE, Bridesburg, Philadelphia, 37, Pa. J-5

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WANTED—USED MOTORS

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2—175 H.P. squirrel cage 440 volt, 3 phase, 60 cycle, 450 motors, with starting compensators.

We can offer for sale or exchange two 550 volt motors to be released after purchase and installation of the 440 volt motors. Further details on request. In replying please give full information on 440 volt motors including price. Reply Box 50-604 care Paper Trade Journal. F-2

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WANTED

WANTED

Serviceable Grocery Bag Machine
8 through 20 lb. sizes.
Recent Model Potdevin preferred.
Address Box 50-450, care Paper Trade Journal. TF

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WANTED FOR EXPORT—1 Pulp Mill complete, in operating condition. Address Box 50-571 care Paper Trade Journal. D-7

WANTED—Brightwood Box Machine, Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic presses, Sheridan Presses, Dryers. Address Box 50-193 care Paper Trade Journal. TF

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1—1½ lb. Laboratory Beater.
1—500 lb. Beater—iron tub.
1—Dilts Iron Tub Laboratory Beater. Beater roll 14" diameter x 10½" face, including motor.

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1—72" 5 roll Calender Stack.
1—2 roll pressure calender—32" x 108".
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1—96" Murray 4 knife Chipper—anti-friction bearings.

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1—Jeffrey Hammermill.

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1—30" diameter x 72" face.
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1—48" diameter x 84" face.
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2—14 ft. Rotary Digesters.

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1—Complete unit, consisting of 6 dryers, 36" diameter x 38" face, including frames, gears, anti-friction bearings.
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3—36" diameter x 95½" face.
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1—24" diameter x 130" face.
1—48" diameter x 70" face.
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1—48" diameter x 82" face.
12—36" diameter x 70" face—complete with bearings, gears & frames.
2—Dryers 48" diameter x 134" face.

FELT CONDITIONER
1—146" Nash Felt Conditioner.

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1—6 plate Shartle Flat Screen
4—Packer, 12 plate, roller shoe type.

FRAMES
Vertical frames for 100 dryers, 48" diameter, with bearings.

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2—Noble & Wood Mammoth Junior.
1—Emerson Jordan—25 to 30 tons capacity—iron plug including new spare iron plug.

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2—IMPCO Lime Sludge Filters, vacuum type, 5' diameter x 4' face.

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2—Daniels Rag Cutter.
1—Taylor-Stiles Giant Shredder, portable.

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Write us regarding your requirements.

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Various cone and assorted pulleys.

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Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.

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2—42" Cameron—Type 24-2-A.
1—42" Cameron—Type 9-3.
1—118" 2 drum Waldron
2—112" Cameron—Type 18.
1—104" Beloit two drum winder.
1—42" Cameron Constant Tension with pneumatic control.
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1—42" Cameron—Type 24-3A.
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Advise as to your requirements.

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TO BE SOLD AS A COMPLETE MACHINE:

One complete 60" trim right-hand Pusey & Jones Fourdrinier Machine consisting of two main presses, one smoothing press, 35 dryers—28" diameter by 66" face mounted in triple-deck frame, seven-roll calender stack, reel, Moore & White cutter & layboy, drives, line shaft, and prime mover.

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One 3-ply Black-Clawson paster with 15 Black-Clawson 48" by 54" seamless dryers mounted on double-deck frame.

Moore & White cutter, drive, and prime mover.

CAN BE SOLD AS SEPARATE ITEMS:

One Twentieth Century 64" Seybold ream cutter, motor driven.

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Three 30" two-colored printing machines with festoon dryers.

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Several small items both for the converting and auxiliary equipment.

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J-5

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Thwing-Albert Instrument Co.

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Magnus Metal Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Timken Roller Bearing Co.
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Black Clawson Company
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Smith & Winchester Mfg. Co.
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Dilts Machine Works, Inc.
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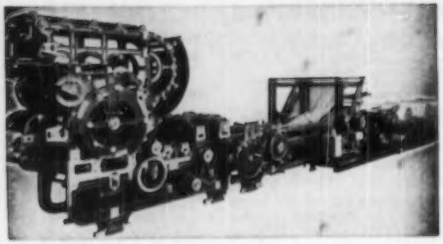

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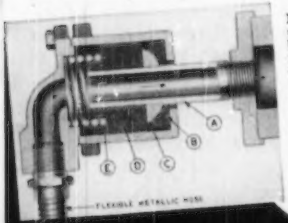

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Weber, Herman G., & Co., Inc.

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American Cyanamid Company Industrial Chemicals Division
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The Goodyear Tire & Rubber Company
Hercules Powder Co.
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Ross Engineering Corp., J. O.
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Smith & Winchester Mfg. Co.
Sonoco Products Co.

CORROSION RESISTANT
Amercoat Corporation

COTTON LINTER
Railway Supply & Mfg. Co.

COUPLINGS
Black Clawson Company
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Link Belt Company
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Thomas Flexible Coupling Co.
Valley Iron Works
Waldron Corp., John

CRANES
Cleveland Crane & Engrg. Co
Industrial Brownhoist Corp.
Link Belt Company
Whiting Corp.

CURL TESTER
Thwing-Albert Instrument Co.

CUTTERS
Black Clawson Company
Dilts Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Harris-Seybold Co.
Moore & White Co.
Perkins & Son, Inc., B. F.
The Sandy Hill Iron & Brass Works
The Smith & Winchester Mfg Co.
Taylor, Stiles & Co.

CYLINDER MOULDS
Manchester Machine Co.

CYLINDERS
M. W. Jenkins Sons, Inc.
National Tube Co.

DAMPENERS
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

DECKLE WEBBING
Williams-Gray Co.

DEFIBRATORS
American Defibrator Co.

DE-INKING
The Cowles Company
Dilts Machine Works
General Dyestuff Corp.
Kinsley Chemical Co.
Roderick O'Donoghue
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DEINKING CHEMICALS
E. I. Du Pont De Nemours & Co., Inc.
General Dyestuff Corp.
Kinsley Chemical Co.
Monsanto Chemical Company
Nopco Chemical Co.

DE-MINERALIZING EQUIPMENT
Hungerford & Terry, Inc.
The Permutit Company

DEMULSIFIERS
Wyandotte Chemicals Corp., Michigan Alkali Div.

DENSOMETERS
Bunge Pulp & Paper Co.
W. & L. E. Gurley

DESIGN CONSTRUCTION
Ebasco Services

DETERGENTS
American Cyanamid Company Industrial Chemicals Division
Calgon, Inc.
Cowles Chemical Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DEWAXING CHEMICALS
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

DIFFERENTIAL SCALES
Thwing-Albert Instrument Co.

DIGESTERS
Babcock & Wilcox Co.
Chicago Bridge & Iron Co.
Lukenweld
Pusey & Jones Corp.

DIGESTERS (Continuous)
Paper & Industrial Appliances

DIRTEC
Bird Machine Co.

DISPERSING AGENTS
Calgon, Inc.
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DOCTORS
Bird Machine Company
Black Clawson Company
Downingtown Mfg. Co.
Lobdell. Co.
Lodding Engineering Corp.
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
Bird Machine Company
Lodding Engrg. Corp
The Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DRIERS
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Hardinge Company, Inc.
Lukenweld
The Moore & White Co.
Murray Mfg. Co., D. J.
J. J. Ross Company
Red-Ray Mfg. Co., Inc.
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

DRILLED SUCTION COUCH ROLLS
Manchester Machine Co.

DRILLED SUCTION DRUM ROLLS
Manchester Machine Co.

DRIVES
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Bird Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Farrel-Birmingham Co.
General Electric Company
Gibbs-Brower Company, Inc.
Rodney Hunt Machine Co.
Link Belt Company
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

DRUM WINDERS
Manchester Machine Co.

DRYER DRAINAGE
Stickle Steam Specialties Co.

DRYER ROLL PYROMETER
Thwing-Albert Instrument Co.

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
M. W. Jenkins Sons, Inc.
E. D. Jones & Son Co.
Moore & White Co.
D. J. Murray Mfg. Co.
John Waldron Corp.

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M. W. Jenkins Sons, Inc.

DYESTUFFS
American Cyanamid Company, Calco Chemical Div.
Bunge Pulp & Paper Co.
Ciba Company
E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
General Dyestuffs Corp.
National Aniline Division, Allied Chemical & Dye Corp.

ELECTRIC HYGROMETER
Thwing-Albert Instrument Co.

EMBOSSING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
John Waldron Corp.

EMBOSSING ROLLS
The Appleton Machine Co.
Gibbs-Brower Company, Inc.
Northern Engraving & Mch. Co
B. F. Perkins & Son, Inc.
John Waldron Corp.
Wheeler Roll Co.

EMULSIFIERS
General Dyestuff Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wallerstein Co., Inc.

EVAPORATORS
Davis Engrg. Corp.
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

EXPANDERS
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FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FEEDERS
Hardinge Company, Inc.
Leeds & Northrup
Merrick Scale Mfg. Co.
The Permutit Company

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Asten-Hill Mfg. Co.
Draper Bros. Corp.
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The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS
American Cyanamid Company, Industrial Chemicals Division
A. M. Meincke & Son, Inc.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

FILTERS
Bird Machine Company
Green Bay Fdy. & Mch. Co.
Hardinge Company, Inc.
J. M. Huber Corp.
Hungerford & Terry, Inc.
Johnson Corp.
Moore & White Co.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Walworth Company

FITTINGS
Crane Company
Shartle Bros. Mch. Co.
Walworth Company

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John Waldron Corp.

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The Goodyear Tire & Rubber Company
Norton Co.

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The Sandy Hill Iron & Brass Works

FORK LIFT TRUCKS
Towmotor Corp.

FORMATION TESTERS
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Williams Apparatus Co., Inc.

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The Moore & White Co.
Noble & Wood Machine Co
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

FREENESS TESTERS
Testing Machines, Inc.

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De Laval Steam Turbine Co.
Downingtown Mfg. Co.
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Farrel-Birmingham Co.
E. D Jones & Sons Co.
Link Belt Company
Moore & White Co.
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Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
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Carthage Machine Co.
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Gibbs-Brower Company, Inc.
Lobdell Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

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Norton Company

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The Moore & White Co.
Mount Hope Machinery Co.
John Waldron Corp.

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Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works

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National Starch Products, Inc.
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Stickle Steam Specialties Co.
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General Electric Co.
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Ross Engineering Corp., J. O
Stickle Steam Specialties Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

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HUMECTANTS
Aktivin Division, Heyden Chemical Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
American Cyanamid Company Industrial Chemicals Division
B. F. Goodrich Chemical Co.

INDENTING MACHINES
Dilts Machine Works

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National Technical Laboratories
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Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

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Shartle Bros. Mch. Co.

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Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

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The Wellman Engrg. Co.

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Lobdell Co.
Testing Machines, Inc.

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National Wax Company

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Williams Apparatus Co., Inc.

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General Electric Company
Reliance Electric & Engrg. Co.

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Canadian Newsprint Supply Co.

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The International Nickel Co.

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Link Belt Company

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Langston Co., Samuel M.

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Crane Company
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General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
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PLASTICIZERS
American Cyanamid Company Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Nopco Chemical Co.

PLATERS
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Perkins & Son, Inc., B. F.

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PRESSES
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Dietz Machine Works
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
The Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
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Nash Engineering Co.
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Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

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Rohm & Haas Co.

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Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones Corp.
Ross Engineering Corp., J. O.
Valley Iron Works Co.

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Black Clawson Company
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Downingtown Mfg. Co.
Hodson Sharp Machine Co.
Moore & White Co.
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
Bauer Brothers Co.
The Cowles Company
Dilts Machine Works
Gibbs-Brower Company, Inc.
Anton J. Haug
E. D. Jones & Sons Co.
Morden Machines Co.
Murray, D. J., Mfg. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
American Paper Machy. & Engrg. Works, Inc.
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
DeZurik Shower Company
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Taylor Instrument Companies
Wallace & Tiernan

RESINS
American Cyanamid Company, Plastics & Resins Division
The Dow Chemical Company
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co., Resinous Products Div.

ROLLS
Appleton Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell Co.
The Moore & White Co.
D. J. Murray Mfg. Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Co.
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
U. S. Rubber Co.
Valley Iron Works Co.
Waldron Corp., John
Wheeler Roll Co.

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Stowe-Woodward, Inc.

ROLL HANDLING EQUIPMENT
Dilts Machine Works (Kohler Systems)

ROLL STANDS
Cameron Machine Co.
Dilts Machine Works (Kohler Systems)
Frank W. Egan & Co.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.
H. G. Weber & Co., Inc.

ROPE CARRIERS
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The Moore & White Co.
The Sandy Hill Iron & Brass Works

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F. L. Smidth & Co.

ROTARY STEAM JOINTS
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The Moore & White Co.
Shartle Bros. Mch. Co.

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SATURANTS
B. F. Goodrich Chemical Co.

SATURATING MACHINES
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

SAVEALLS
Bird Machine Company
Chicago Bridge & Iron Co.
Green Bay Fdy. & Mch. Wks.
Hardinge Company

SCALES
Fairbanks, Morse & Co.
Merrick Scale Mfg. Co.
Testing Machines, Inc.

SCREEN PLATES
Bird Machine Company
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Testing Machines, Inc.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Company
Bird Machine Company
Carthage Machine Co.
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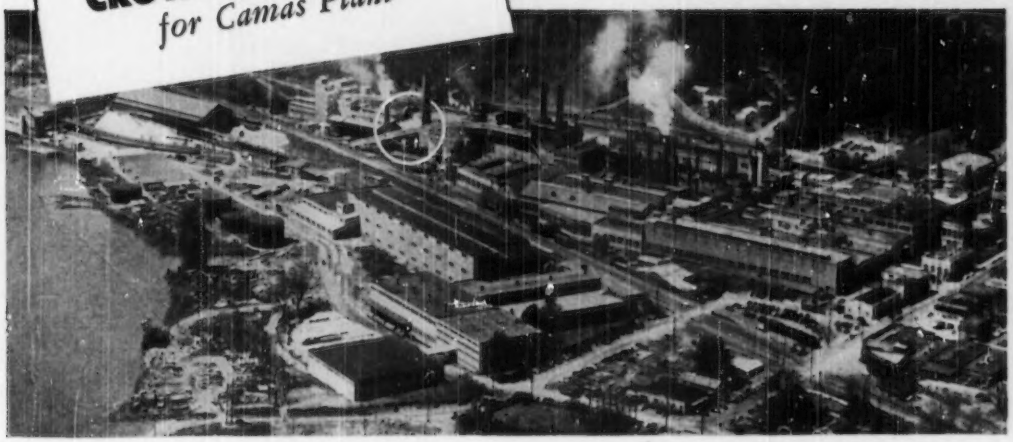

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